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ABSTRACT

This publication presents a collection of 26 environmental education case studies recognized as being representative of curriculum materials and/or projects. Contained are action programs that can serve as models for the classroom teacher, principal, curriculum consultant, superintendent, state department official, or teacher educators in the planning and development of programs for local situations. The components, antecedents, and distinctions of environmental education are outlined as a frame for the selected case studies. The selected case studies include: the Maine Environmental Education Project; Watershed Heritage Project; Project SCATE; Project KARE; the Tennessee Valley Authority's Environmental Education Program; Conservation and Environmental Education in Michigan; METRO-APEX; Project Learning Tree; Washington Environmental Yard (Project WEY); The Role of Mass Media in Environmental Education; Project I-C-E; and Extension's Contribution to Environmental Education. (BT)

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ENVIRONMENTAL EDUCATION IN ACTION - I:
CASE STUDIES OF SELECTED
PUBLIC SCHOOL AND PUBLIC ACTION PROGRAMS

Selected and Edited by

Clay Schoenfeld
and
John Disinger

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and Environmental Education
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Columbus, Ohio 43212

April 1977

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ENVIRONMENTAL EDUCATION INFORMATION REPORTS

Environmental Education Information Reports are issued to analyze and summarize information related to the teaching and learning of environmental education. It is hoped that these reviews will provide information for personnel involved in development, ideas for teachers, and indications of trends in environmental education.

Your comments and suggestions for this series are invited.

John F. Disinger
Associate Director
Environmental Education

Sponsored by the Educational Resources Information Center of the National Institute of Education and The Ohio State University.

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FOREWORD

Today's citizen has been saturated with the message, "As man enters the latter portion of the 20th Century, he stands at a fork in the road for making the proper decisions concerning the quality of the environment." Several related questions have been raised: "Are our schools ready, with a planned program, to prepare today's first-grader (age 6 in 1977) for his post-secondary world (age 18 in 1989), or for the turn of the century (age 29 in 2000)?" "Is there a basic environmental education curriculum that will be relevant, not only for the present, but for the next century?"

This collection of environmental education case studies is especially well timed because it presents specific examples, from various levels of the educational spectrum, describing "what we did;" "how we did it;" and "what we learned." No matter which date one prefers to use as the arrival of the "environmental age," the fact remains that, until quite recently, there were very few curriculum materials and/or projects that presented a well articulated K-12 environmental education program: a program that was concerned with the total environment, its interdisciplinary aspects, the role of humankind, the esthetic dimensions, and the search for open-ended options and solutions.

This volume contains realistic action programs that can serve as models for the classroom teacher, principal, curriculum consultant, superintendent, state department official, or teacher educator. Any who wish to take the first step in preparing quality environmental education programs will find many commendable examples that will aid them in planning for their local situations.

The editors of this book are eminently qualified to bring these writings together. They have acquaintance with leaders and knowledge about programs throughout North America. Clay Schoenfeld, Professor of Journalism and Wildlife Ecology, and Chairman of the Center for Environmental Communications and Education Studies at the University of Wisconsin-Madison, has devoted a dozen years to "communicating" an integrated approach to environmental education. His founding and editorship of The Journal of Environmental Education is ample evidence of his commitment to discovering more effective ways to convert environmental awareness into ecological action. In his role as Associate Director for Environmental Education for the ERIC Information Analysis Center for Science, Mathematics, and Environmental Education at The Ohio State University, John Disinger has probably reviewed more environmental education curriculum materials than anyone else in the nation. The Environmental Education Advisory Board of ERIC makes recommendations concerning future directions for SMEAC Environmental Education activities which, in the past, have included Information Bulletins, State Coordinators Newsletters, National Directories of Projects and Programs, Teaching Activities for Environmental Education, Reviews of Research in Environmental Education, and conference/convention proceedings. This book of case studies is the end result of one of those recommendations.

A careful reading of the contents should provide added assurance that environmental education planning, curriculum development, and evaluation have improved and will continue to enhance the quality of education in today's world. In turn, environmental education could result in producing an environmentally literate and humanistic citizenry capable of creating policies and implementing practices that will maintain and improve this culture's quality of life.

William M. Hammerman
Professor of Education
San Francisco State University

April 1977

PREFACE

The studies in this volume were solicited by the editors following identification of types of programs of interest, recommendations of many environmental educators including members of the ERIC/SMEAC Advisory Board for Environmental Education and State Education Agency Specialists in Environmental Education, and agreement between the editors with respect to the specific studies to be requested. An attempt was made to secure studies from a broad spectrum of emphases. Most of the studies were written specifically for this compendium, on request. The editors thank the authors of these studies, and their institutions, organizations, and agencies, for their willingness to prepare them, and particularly for their response to the admonition for straightforward reporting and analysis. The case studies are arranged alphabetically by author.

C.A.S.
J.F.D.

April 1977

ABOUT THE EDITORS

CLAY SCHOENFELD is Joint Professor of Journalism and Wildlife Ecology, and Chairman of the Center for Environmental Communications and Education Studies at the University of Wisconsin-Madison. From 1969 to 1975 he was the founding executive editor of The Journal of Environmental Education. He helped draft the National Environmental Education Act of 1970. His other books in the field include Everybody's Ecology, Outlines of Environmental Education, Interpreting Environmental Issues, Human Dimensions in Wildlife Programs, Wildlife Management in Wilderness, Canada Goose Management, and Cabins, Conservation, and Fun. Professor Schoenfeld is a member of the Board of Directors of the National Association for Environmental Education, and a consultant to the U.S. Office of Education, the Conservation Foundation, the National Park Service, the Bureau of Land Management, the U.S. Forest Service, the U.S. Corps of Engineers, and the Wisconsin Environmental Education Council.

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CONTENTS

Foreword iii

Preface v

About the Editors vi

Introduction 3

New Jersey Master Plan for Environmental Education and the Development and Implementation of Environmental Education Computer-Based Resource Units, by Edward J. Ambry 16

Chesapeake Bay Foundation Public Education Workshops, by F. Samuel Bauer 26

Maine Environmental Education Project, by Dean B. Bennett 33

Total Education for the Total Environment: The Program of the First National Center for Environmental Education, The Pinchot Institute for Studies in Conservation, by Matthew J. Brennan 40

Monroe County Community School Corporation Resident Outdoor Education Program, by Donald J. Brown 54

Watershed Heritage Project, by Joseph H. Chadbourne 64

Environmental Education in Billings, Montana...An Overview of the Development and Components of One Program, and Its Rather Sudden Evolutions to a New Program, by Wilson F. Clark 89

Project SCATE (Students Concerned About Tomorrow's Environment), by Ronald Harshman 105

Project KARE (Knowledgeable Action to Restore our Environment), by Matthew M. Hickey 112

Development of the Tennessee Valley Authority's Environmental Education Program, by Lynn M. Hodges 143

Conservation and Environmental Education, Michigan Department of Natural Resources, by Barbara Horn 156

Off-Campus Activities in Calgary, Alberta, by J. Reg Houghton . . . 160

King Center Environmental Education Program, by Margaret C. Hyland and Charles E. Kupchella 169

METRO-APEX, an Ongoing Task for Environmental Research, Teaching and Education, by Mark James 183

Extension's Contribution to Environmental Education, by W. R. Jenkins, Harold I. Owens, and Lawrence Heffner 195

Environmental Education in the Sunshine, by David E. LaHart and C. Richard Tillis 202

Environmental Education in the Mobile County Public Schools, by Michael A. Magnoli 216

The Miami-Dade Community College Man and Environment Television Learning System, by Robert H. McCabe and Franklin Bouwsma . . . 223

Project Learning Tree, by June McSwain 231

Washington Environmental Yard (Project WEY), by Robin C. Moore and Herbert H. Wong 240

Minnesota Environmental Sciences Foundation, Inc., by Michael J. Naylon 254

Environmental Education in Massachusetts, by Charles E. Roth 264

Western Regional Environmental Education Council, by Rudolph J. H. Schafer 274

The Role of the Mass Media in Environmental Education, by Clay Schoenfeld 296

Project I-C-E (Instruction-Curriculum-Environment), by Robert J. Warpinski 307

Center for Open/Non-Graded, Career, and Environmental Programs (COCEP), by Terry L. Wilson 319

Epilogue 336

ENVIRONMENTAL EDUCATION IN ACTION - I:

CASE STUDIES OF SELECTED

PUBLIC SCHOOL AND PUBLIC ACTION PROGRAMS

INTRODUCTION

The popular, semi-technical, and professional literature of environmental education is growing, but there has been up to now no current compendium of case studies outlining the who-what-where-when-why-how of environmental education programs on the part of representative agencies and organizations in varied settings. This book attempts to fill that role, with the emphasis on public school and public action programs. Projected later volumes will examine environmental education at the college-university level and on the part of voluntary associations.

As a frame for the selected case studies that follow, this introduction outlines the components, antecedents, and distinctions of environmental education.

COMPONENTS OF ENVIRONMENTAL EDUCATION

Barring reading, writing, and arithmetic, few subjects are being taught today in so many diverse ways and places, by such a mixture of agencies, groups, institutions, and people, as that complex of cognitive content and affective process known, precisely or not, as environmental education. To paraphrase Aldo Leopold (1938), it is, by common consent, a good thing to engage in environmental education. But wherein lies the goodness, and what can be done to encourage its pursuit? On these questions there is confusion of counsel, and only the most uncritical minds are free from doubt. The latest definitive book on the subject concludes there is "no clear, single answer" to "what makes education environmental" (McInnis and Albrecht, 1975). Such diversity may be in fact the mark of a healthy environmental education ecosystem.

If one is pressed for a succinct definition of environmental education, the latest attempt may be as good as any—UNESCO's "Belgrade Charter" (UNESCO, 1976):

> [Environmental education is a life-long, interdisciplinary approach to the development of] a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

Or you can try something a little more involved (Horn and Rogers, 1975):

> [Through environmental education, we learn to] understand the behavior-determining aspects of human value systems, of personal and cultural attitudes, and of psychological and physiological needs. Simultaneously, we learn the basic functional

> requirements of healthy ecosystems. With these understandings we can distinguish the range of human behavior that is compatible with the continued health of the ecosystems that sustain us, and on the basis of such distinctions prescribe policies that will assure healthy interactions between humans and their natural environments.

The *Federal Register* of January 30, 1974, with surprising simplicity, calls environmental education "the process that fosters greater understanding of society's environmental problems and also the process of environmental problem-solving and decision-making."

Whatever definition of environmental education you employ, all will invariably have certain common denominators. First, there is a hard core of ecological *content*. Second, a recognition of worldwide problems of *crisis* proportions. Third, a component of *conscience*, of a value system. And fourth, a *commitment* to private and public action. The whole is focused on a *comprehensive* rather than a compartmentalized approach to change in people-land relations, be they open-country or urban, and frequently with an element of *career* education.

ANTECEDENTS OF ENVIRONMENTAL EDUCATION

An examination of these components will indicate that environmental education did not "burst upon the scene in the wake of World War II," as some writers are wont to suggest (Swan, 1975). It is more correct to say environmental education has come gradually to first flower. It is a plant of many roots, many stalks, many branches, and many fruits, some of the latter relatively unpalatable. From its antecedents, several of them dating back a century, environmental education has drawn a number of its characteristics. One of the oldest root-stocks is *nature study*, a sort of transcendental search to understand the "vast, pulsing harmony" of our natural environs. *Ecology* represents a more sophisticated "study of the interrelations of organisms and their environments." *Conservation education* adds the concept of a concern for the wise use of natural resources over time. In a recent form, conservation education becomes *energy* education. *Outdoor education* contributes a hands-on approach to experiences that can cut across the curriculum. *Citizenship education* seeks to generate an appreciation of the American endowment and a commitment to social action. *Consumer education* focuses on the shortcomings and excesses of our economic system. *Population education* attacks the twin shibboleths of limitless growth and conspicuous consumption. *Resource management education* represents the professionalization of certain distinct people-land relationships: soil conservation, water management, game management, park management, urban and regional planning, landscape design, architecture, metropolitan management, environmental engineering, environmental health, environmental law, and so on through the departmentalization of universities. *Philosophy and religion*, on occasion, address the esthetic and ethical dimensions of Leopold's (1947) community of life that "includes the soil, waters, fauna, and flora as well as people."

A small illustration may sharpen the distinctions among environmental education and its predecessors:

We purchase a back 40 in the country. In the process of acquiring the wherewithall to do so, we have used natural resources—gas, light, heat, food, shelter—in earning money providing people with certain goods and services. With the proceeds we opt to stake out our own private preserve rather than cruise the continent or carouse. This is consumer education in operation.

On our 40 we fence the cows out of the rocky hillside woodlot, with government aid we dam up the pasture gully that would otherwise continue to silt downstream cornlands, and we also plant pines in appropriate locations. This is conservation education applied.

On the pond that forms in our valley, one morning there are two small wild waterfowl. One has a white crescent in front of the eye and a chalky-blue patch on the fore edge of the wing; the voice, a peep. The other is brown-mottled, with the same blue wing-patch, the voice a soft quack. They are blue-winged teal. We watch them cruise and feed and bob their heads in unison. They are paired. This is nature study in action.

The next morning our bluewings are joined by another pair, which attempts peacefully to occupy a corner of the pond, but the "owner" drake is having none of the intrusion. He attacks with a great flurry of bill and wing. Why? He is exercising his territorial instinct that tells him there is only room on the little pond for one pair of teal—only so much nesting space, so much food, so much resting area. This carrying capacity concept we know to be a tenet of ecology.

On our 40 acres we install "No Trespassing" signs every 50 yards around the perimeter. No way will we subdivide. We are exercising our own territoriality, escaping from intolerable "social distance" in the city. This is outdoorism.

Whose territory will last the longest, ours or the teal's? Will we pollute our pond with assorted run-off until it is no longer fit habitat for a bluewing, or will the planet one day whirl along on its interstellar journey, loaded with woodlots, ponds, and teal, without a human aboard? This is the challenge posed by environmental education.

It is environmental education that tries to put it all together. Environmental educators of many stripes seek a rigorous understanding of "the integrity, stability, and beauty" of the community of life, a hearty awareness that "a thing is right only when it tends to preserve" that community, and a tough rejection of "the argument that an action is impossible if it does not yield quick profits, or that an action is necessarily to be condoned because it seems to pay." That philosophy, as Leopold said (1947), "is dead in human relations, and its funeral in land relations is long overdue." To make operational this "ecological conscience" constitutes the intellectual revolution the "subversive science" of applied ecology seeks to foment (Shepard and McKinley, 1967).

A basic message of environmental education is interdependence—that everything is connected to everything else. That is the principal intuition of the 20th century (Perlinski, 1975). The practical problem lies in how to recognize and effect sound, fair trade-offs among energy, economy, and environment. A basic characteristic of environmental education is that diverse men, women, media, methods, and modes are involved.

THE EVOLUTION OF ENVIRONMENTAL EDUCATION

The earliest type of education had to be a type of environmental education. Prehistoric man's survival depended on his knowledge and understanding of his environment (LaHart and Tillis, 1974). Hence he evolved as a superb ecologist. He could not run fast enough to escape his enemies; if caught, his teeth and claws were small protection. So he had to become a student of his relationship to the veldt. Peering from his hiding place in the bushes around a clearing or from the opening of his cave, his science was the practical kind. His laboratory was the place he lived; the success of his observations could be measured in whether he made it through the night or didn't (Fabun, 1970).

Perhaps the first American environmental educator was Henry Thoreau, although as he confesses in Walden, no journal editor ever saw fit to print the bulk of his contributions, so Henry published his own. Thoreau frequently expressed concern over the encroachments of civilization on what his fellow townsman Ralph Waldo Emerson called "the medicinal enchantments of nature." Thoreau was to be followed by George Perkins Marsh, whose Man and Nature was an environmental firebell in the night in 1864.

Beginning as early as the 1870's it was the hunter, fisherman, and birdwatcher in search of science, serenity, or recreation in the outofdoors who first sensed in any numbers the ill effects of what Eric Sevareid was to call "the misdevelopment" of America. Outdoorsmen saw the ravages of logging and forest fires, of farm soil erosion, of lake and stream pollution—and the resulting destruction of fish and wildlife habitat. Sportsmen and bird lovers approached these problems with some of the patience and perserverence of the stalk—but with none of the silence. They began to call loudly, through voluntary organizations and campaign literature, for government help (NSSF, 1971).

The Woodward and Bernstein of the early conservation movement were George Bird Grinnell and Emerson Hough, Grinnell as editor and publisher of Forest and Stream, a high-class New York weekly, and Hough as his prize investigative reporter. Through a long series of editorials and exposes, they educated the public to support pioneer state and federal legislation affecting parks, forests, and wildlife. Grinnell became a founding member of the Boone and Crockett Club, a group of distinguished sportsmen, and founder of the Audubon Society of New York, forerunner of the National Audubon Society (Reiger, 1975).

It was a fellow Boone and Crockett founder, Teddy Roosevelt, who propelled conservation into the national lexicon from his "bully pulpit" in the White House. At his side was the premier pioneer adult educator of the day, Gifford Pinchot, head of the infant U.S. Forest Service (Strong, 1971). A biographer of Pinchot as an educator says the devices his team used were "as sophisticated as any could have been without the availability of broadcast media": publications, newspaper publicity, periodicals, teacher training, field manuals, correspondence, organizing of outside groups, and, of course, the staging of such events as the celebrated 1908 White House Conference on Conservation (Levin, 1972).

Two other teams of adult educators were to play major roles in the early conservation movement. The combination of Robert Underwood Johnson, as editor of Century Illustrated Magazine, and John Muir and John Burroughs as his nature writers led directly to legislation setting up national parks (Mott, 1967). Bringing the new National Park Service itself to the attention of the public was the work of two former New York Sun reporters turned adult educators, Stephen Mather and Robert Sterling Yard (Fischer, 1973). Mather sponsored the rise of a particular breed of environmental educator, the interpretive naturalist in the national parks, beginning at Yosemite in 1920 (Weaver, 1976).

In 1934 appeared the first Roger Tory Peterson Field Guide to the Birds. It sold out immediately and has never been headed. Few people have drawn so many other people to an active awareness of the natural world as this unusual writer-painter-photographer-lecturer-ornithologist. Significantly, Peterson characterizes himself as "really a teacher, teaching through a visual medium" (Graham, 1971).

Howard Zahniser introduced radio and conservation to each other. From 1931 to 1942 he served the Bureau of Biological Survey and its successor agency the U.S. Fish and Wildlife Service as editor, writer, and broadcaster on wildlife research, administration, and conservation. In 1945 he joined the Wilderness Society as executive secretary and editor of its journal, The Living Wilderness. He was the father of the Wilderness Act of 1964, which he was largely instrumental in writing and seeing through to enactment. As a pioneer in conservation radio, of course, Zahniser had a master colleague—FDR and his fireside chats. The Plow

The Plow that Broke the Plains, a New Deal film Documentary in defense of soil conservation, was a landmark. But more than any other single man perhaps, Ansel Adams has married conservation to the camera. Essentially a freelance photographer, his monumental photomural collection, This is the American Earth, stirred hearts and minds to awareness, interest, and action, and kept the Sierra Club solvent (Clepper, 1971).

If one is pressed to put a date on the arrival of the environmental age, it would not be E-Day, April 22, 1970, but in 1954, when an unprecedented consortium of conservation groups, put together by a remarkable David named Brower, head of the Sierra Club at the time, took on the Goliath of the Western waterpower development interests--and won, by slinging an educational campaign squarely between the eyes of a scheme to inundate Dinosaur National Monument. Sounding the battlecry was Ulysses S.

Grant III, grandson of the President who had personified the exploitation of another era: "Our industrial civilization is creating an even greater need for the average man . . . to reestablish contact with nature . . . and to be diverted from the whirling wheels of machinery and chance. It would be tragic to sacrifice the canyons of Colorado for a few acre-feet of water and a few kilowatt hours." Congress capitulated (Nash, 1969).

Dinosaur saved was a symbol of something very significant. Conservationists of diverse hues had coalesced into a public education tool of great effectiveness, using economic statistics quite as much as esthetic sentiments to stop in its track what had hitherto been called destiny. Their appetite for action whetted by their new-found sense of power, Sierra Clubbers and their colleagues were poised for the environmental decade.

In 1962 a rather small paperback hit the bookstands of America with all the impact of a blockbuster, authored by a former U.S. Fish and Wildlife Service editor-biologist. Quietly and calmly she questioned the massive use of chemical pesticides. Rachel Carson's Silent Spring probably did more to alert the American people to the critical needs of their environment and their own health than any form of adult education before or since (Trefethen, 1975). The message was reinforced by Udall's Quiet Crisis in 1963, a paperback edition of Leopold's Sand County Almanac in 1966, the Rienows' Moment in the Sun in 1967, and Ehrlich's Population Bomb in 1968.

The specific term "environmental education" was probably first introduced by Mathew J. Brennan, Director of the Pinchot Institute for Conservation Studies, speaking to the American Nature Study Association in 1964. According to Swan (1975), the first time the term environmental education appeared as part of a title of a paper in a learned journal was in the Summer 1968 issue of Education Record (an article on "The University and Environmental Education" written, incidentally, by one of the editors of this book). The next fall the Pennsylvania Education Association devoted an entire issue of its monthly magazine to environmental education. The movement was on its way, and the world of education would never be the same again.

Television as an inadvertent tool of mass environmental education came dramatically to the fore in 1969 with brilliant camera coverage of two compelling scenes: the view from the moon of a very fragile spaceship earth, and the photogenic blot on that planet with an ugly oil slick emerged from Platform A of the Union Oil Company in Santa Barbara Channel. The same year environmental education acquired academic respectability with the appearance of the scholarly Journal of Environmental Education.

From all such sentiments and scenes in the 1960's the broad realization grew that humankind itself was a part of the environment, that our welfare was at stake, and that it hinged upon the welfare of all other things, animate and inanimate. For thousands of years people had gone forth to multiply and subdue the earth as a chosen species; now that premise came under examination. There emerged a more ecocentric view of life, a recognition that we must ameliorate our impacts on the environment by knowing before we act what they are likely to be (McInnis and Albrecht, 1975). Today, environmental education "seeks a rather fundamental reordering of thought and action away from growth, control and mastery over nature, and progress traditionally defined, and toward an ecologic ethic and different definition of 'quality of life' than that which has incurred such environmental cost" (Miles, 1976).

Whatever their family or genus, no environmental educator today is so naive as to believe modern humankind will necessarily achieve complete harmony with the natural world any more than we will surely achieve world justice or liberty for all people. In these higher aspirations, as Leopold (1947) wrote, "the important thing is to strive." The capacity to live without befouling and denuding the environment—this was Leopold's (1933) test of whether we are civilized. Environmental education can be one of the means of developing a culture that will meet this test.

ENVIRONMENTAL EDUCATION AND THE PUBLIC SCHOOLS

Whether it took its impulse largely from a technocratic gospel of efficiency (Hays, 1959), or from a populist revolt against wasteful monopolies (McConnell, 1954), or from an evangelical concern for nature's vast, pulsing harmony (Muir, 1901), it is clear from the record that the 1890-1910 period saw the appearance of an American political and philosophical phenomenon which Pinchot (1937) labelled "conservation."

So astute were the varied leaders of the first conservation movement, and so widespread their adherents it was perhaps inevitable that American public education would feel the impact. At least as early as 1893, a Committee on Secondary School Studies of the National Education Association urged that at least one hour a week of "nature study" be offered throughout the elementary grades, and that "at least one-fourth of the time in high school be devoted to nature study and that this amount of preparation be a requirement for entrance to college" (Eliot, 1893). To support K-12 instruction, Pinchot's Forest Service developed classroom materials and teacher institutes (Levin, 1972). From the campus of Cornell University, Professors Liberty Hyde Bailey, Anna Botsford Comstock, and later E. Laurence Palmer began to pour out their long series of Rural School Leaflets on nature study (Swan, 1975).

While the scope and content of nature study were never precisely defined, Hurd (1949), Roth (1969), and Balzer (1971) are in general agreement that its object was to get children to know and love their surroundings. There was much concentration on esthetic, emotional, and moral values rather than on scientific principles, and little applied concern for broad environmental protection as the term would be known today. The nature study syndrome persisted, became institutionalized under the rubric of "outdoor education," and gradually allied itself with the prestigious American Association for Health, Physical Education, and Recreation (Robinson, 1971). The latter-day leaders came to be Professors L. B. Sharp and Julian Smith in Michigan, espousing Life Fresh Air Camps to "teach outdoors that which can be best taught there" (Swan, 1975).

After its initial peak in the 1890-1910 period, conservation waned as a national concern, only to be revived in the 1930's in what Wehrwein (1936) called "the second conservation crusade." Under the leadership of a second Roosevelt, new federal alphabet agencies emerged to tackle problems of drought and depression, and among them the TVA, CCC, NPB, and F&WS published conservation education materials (Renner, 1939). In keeping with the educational approaches of the time (Underhill, 1941), the "new" conservation education emphasized the development of attitudes, the understanding of principles, conceptions, and generalizations, and the use of scientific procedures in problem-solving. Significantly, chapters on "the conservation of our natural resources" began to show up in the principal high school social studies texts of the time, albeit in an appendix-like position (Frigo, 1976). But once again a world war was to bring another hiatus in the emphasis placed on conservation education in the schools.

As in 1890-1910, however, when the 1960's brought a revival of national concern for environmental protection, the public schools moved with some alacrity to respond, stimulated by a 1970 National Environmental Education Act and its local spin-offs. That year Roth pioneered a cross-discipline list of 112 fundamental concepts for environmental education, K-16, and Archbald (1970) distilled them to a dozen key words. Today a new generation of teachers is increasingly injecting environmental content or conscience into the full range of subjects and years. As backstop, the classroom teacher has a wide variety of exciting new study guides, simulation games, field kits, manuals, and films. One of the best bibliographies of environmental education materials available for elementary and secondary schools is that compiled by Howell and Osborn (1975). To lead him or her by the hand, the classroom teacher has such field-tested manuals as those on environmental education activities by Stapp and Cox (1975). The school administrator has an excellent guide to the in-service training of teachers in environmental education (Gallagher, 1975). There appear to be distinct trends towards "a widespread offering of courses in environmental science, the development of written environmentally-oriented curricula, and better local financing of environmental education programs" (Trent, 1976). A definitive state-by-state report on the status of K-12 environmental education in 1975 (Disinger and Bowman) suggests the breadth and diversity of the movement today.

THE ENVIRONMENTAL EDUCATION ECOSYSTEM TODAY

A wide variety of institutions, agencies, and organizations have an assigned or assumed mandate today to engage in environmental education. What might be called the environmental education ecosystem has five principal elements: the mass communication media, government instrumentalities, eco-action organizations, industry and labor, and educational institutions. In this volume can be found examples of environmental education in action on the part of federal and state government agencies, the mass media, public consortia, an industry, and particularly on the part of the public schools. An epilogue attempts to generalize environmental education program criteria and characteristics today, and to look into the future.

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NEW JERSEY MASTER PLAN FOR ENVIRONMENTAL EDUCATION AND THE DEVELOPMENT AND IMPLEMENTATION OF ENVIRONMENTAL EDUCATION COMPUTER-BASED RESOURCE UNITS

by Edward J. Ambry*

A state with as many environmental dilemmas as New Jersey might seem an unlikely site for a break-through environmental education program. On the other hand, the compelling evidence of creeping environmental degradation on every hand on the Jersey shore may have stimulated early action. At any rate, New Jersey's Computer-Based Resource Unit (CBRU) program really works. Designed for and by classroom teachers who wish to confront their students with environmental concepts, problems, issues and options, the CBRU system essentially is a font of information, readily revisable in a short turn-around time, that can be called up in a variety of ways and formats for large- and small-group instruction or for individualized instruction. It was an expensive program to develop initially, but it is a relatively inexpensive program to operate. Coupled with an extensive in-service training program for teachers, the CBRU system has exceeded its performance standards, as measured by objective tests, conducted by Ph.D. candidates. CBRU materials are now available in eight other Eastern states, and may well spread westward and overseas. The whole development is a signal tribute to Dr. Edward Ambry, its progenitor.

In New Jersey, the environmental dilemmas are many. The state is the most highly urbanized, most highly industrialized and the most densely populated state in the country. If recent projections of further population and industrial growth are even close to the mark, it is difficult to see how the state's already stressed air, land and water resources will bear the burden. As a microcosm of the entire country, there is abundant evidence of environmental breakdown in New Jersey. The statistics on water pollution alone are chilling. Each day 750 sewage treatment plants throughout the state dump more than one billion gallons of inadequately treated wastes into the major drainage basins. These combine with other effluents, move into the coastal marshes, and do irreparable damage to what was once a thriving shellfish industry. A recent survey of DDT concentrations in fish and ducks conducted countrywide by the United States Bureau of Sport Fisheries and Wildlife found the highest concentrations in New Jersey populations. One can only speculate if this is true of the human populations, too. The state's

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environmental dilemma is not limited to these tangible problems alone: the problem is compounded by additional impacts. Green space is disappearing in developments, webs of power and utility lines, and highway lanes. In urban areas parkspace is cut away to widen highways which bypass the city with truck traffic or which serve the huge numbers of commuters who chug into the city in the morning and clog its thoroughfares in the afternoon and evening, passing the urban population with indifference, the transient superstructure of city life today.

There has been much said and written about these problems. But people have become weary of the rhetoric of good intentions, especially when it does not alter the pressure on their lives. While they willingly approve massive bond issues and pay higher taxes for open space acquisition and pollution abatement, they are increasingly marshalling effective and determined citizen opposition to highways, airports, and the loss of natural areas. They are being forced into positions of militancy and righteous indignation. The effects of this mounting environmental consciousness are predictable. Our great institutions, especially government, education and business, are being challenged to assert their leadership as agents of positive social change. They are being asked to provide constructive alternatives to the present course of society which appears to be inimical to the life of quality.

Yet there remain the problems of fusing a deep concern for the environment with the tools of understanding and skills of good environmental management. Seeing the problems, educators were asked to respond with real programs—programs which close the gap between rhetoric and reality, idea and actuality, which address the problems of today in the environment, which treat the learner to the process of critical analysis, which preserve the flexibility necessary to different values —in short, programs which promote environmental literacy.

Since 1967, the New Jersey Council for Environmental Education has faced these questions, and others more specific to the educational needs of the state. During 1970-1971, as a result of a three-year needs assessment, the Council produced the New Jersey Master Plan for Environmental Education. As a primary objective, the plan aimed at the "creation, in the most rapid and efficient way possible, of an environmentally literate citizenry--citizenry which understands its interdependence with and responsibility for the total environment, and which possesses the knowledge and concern to solve existing problems and to prevent future ones."

Approved by the New Jersey Commissioner of Education in 1971, the Master Plan for environmental education has been implemented through the agency of the Council, in collaboration with the State Department of Education and other participating organizations. Within its franchise, the Master Plan has resulted in the creation of a Technical Advisory Committee to the Commissioner of Education, the encouragement of Concerned Citizens Committees on the local school district level, the establishment of a network of agencies and organizations to carry out long-range programs, and the development of a K-12 curriculum in environmental education available to all schools and classrooms in New Jersey, and elsewhere, as Computer-Based Resource Units.

PROBLEMS ASSOCIATED WITH DEVELOPING AND INTRODUCING CURRICULUM FOR ENVIRONMENTAL EDUCATION

A needs assessment survey of all 603 school districts in New Jersey, completed in June 1972, reported three primary inhibitions to including environmental curriculum in schools. These limitations were: (a) staff qualifications, (b) lack of curriculum materials, and (c) availability of funds.

In carrying out the Master Plan, the Council responded to these expressed needs of the schools in the state.

To bridge the gap in teacher preparation, the Council worked with a number of colleges and universities in the development of Master's Degree programs, pre-service and in-service courses. Working with the State Department of Education's Division of Curriculum and Instruction, the Council assisted in a series of in-service courses, conducted over a ten-week period in the tri-county area of Morris, Middlesex and Burlington.

In a large-scale outreach training program, the Council purchased the copyright to a 15-documentary television series, tied to supplement educational texts, designed and produced through a consortium of 100 Community Colleges, under the direction of Miami-Dade Junior College in Florida. Adapting these programs to use in New Jersey, the Council arranged with the Public Broadcasting Authority and the Public Broadcasting Service, WNET—Channel 13, to televise these programs on a semester schedule five times each week (for periods of 18 weeks) over Channels 23, 50, 52 and 59 (PBA), and WNET's Channel 13. Promoted among the state's colleges, the "Man and Environment" course offering has been coordinated with programs in environmental education, science and society, and in-service training. The Council produced teachers' guides, student study guides and in-service guides which, supplemented by a full text, prepared at Miami-Dade, complete a package which has been extensively used across the state and been introduced widely in the Northeast. (See "Miami-Dade" case study, p. 223 ff., this volume.)

As its own Computer-Based Resource Units in Environmental Education came on-line, the Council mounted an aggressive training program in each of New Jersey's twenty-one counties. Aided by a training program composed of an introductory 10-minute film, two filmstrips, and well-developed printed instructional material, collaborators from the Council, the State Department of Education, the Northwestern and Southern Educational Improvement Centers, County Superintendents and County Helping Teachers, close to 10,000 teachers received training in Environmental Education Computer-Based Resource Units through April of 1974. The majority of these teachers have been able to receive and use Computer-Based Resource Guides in their classrooms, and every school district in the state has received at least one training package for continued use.

For Environmental Education, an area of study which was not available to most teachers in their undergraduate preparation, even programs of this scale are insufficient in the long-term. The task of reaching the state's 80,000 teachers, on an in-service basis, and updating training because of assignment changes, evaluation results and feedback is a formidable task which will require extended efforts in ensuing years.

To satisfy the need for curriculum materials was a most difficult challenge, in relation to both development and delivery. Generally, the following were among the basic criteria for development:

The curriculum should be --

1. Interdisciplinary, using data and concepts from social as well as the physical and biological sciences;
2. Designed to meet the needs of teachers and students in urban areas;
3. Organized around environmental problem areas providing teachers and students a wide variety of insights into problems relating to science, society, economics, physical and psychological health, values and group psychology associated with environmental problems;
4. Provisioned with the opportunity to select from among alternatives, based on the exercise of critical skills and the clarification of values;
5. Suitable for use in small group or individual instructional situations;
6. Susceptible to rapid revision and updating of units.

To assist districts throughout the state overcome the disability of limited funds, the Council assisted in the preparation and passage of the state's Environmental Education Act, which had a fiscal note attached to enable the Commissioner of Education to carry out its purposes. Signed into law by the Governor in August 1971, the Act allowed a program of small matching grants for the local school districts and supported local districts and institutions of higher education in preparing proposals for other sources of funding.

THE SEARCH FOR AN EFFECTIVE FORMAT AND DELIVERY SYSTEM

In order to meet the basic curriculum criteria, identified above, an extensive investigation of feasible delivery systems was undertaken. At one point, it was thought that a series of monographs on chosen environmental themes should be produced for delivery to all teachers. The traditional textbook presentation received extended consideration. Because of the criteria and the very nature of information on environmental problems, it was finally decided to produce the curriculum according to a design which could be computer-stored. This would provide a product which was rapidly retrievable, able to be tailored to the needs and interests of individual users, easily accessible to all New Jersey teachers regardless of their location or teaching circumstances. The Council studied several computer delivery systems which were then in development: one at Wayne University, a second in the State of Washington, and a third, which was beginning to build a client audience, at the State University of New York College at Buffalo. The Council also analyzed the Computer Assisted Instructional (CAI) system being marketed by the Westinghouse Learning Corporation, and compared it for flexibility, cost and revision potential with the other models. An offer from Westinghouse to collaborate on unit production for CAI, and resource kits was carefully weighed.

Finally, the Council concluded that the system closest to its own conceptual design was that being developed at Buffalo. The CAI model of Westinghouse, while professionally developed and carefully produced, was judged to be too prescriptive and more expensive than the Council's warrant allowed.

After the Buffalo model was chosen for further experimentation, arrangements were concluded with the Buffalo Research and Development Complex to incorporate the Council's units on Environmental Education as Computer-Based Resource Units. In New York State, the Buffalo system was being introduced widely. In New Jersey, some experimentation with the Computer-Based Resource Unit (CBRU) program had been conducted by a project for handicapped children, known as Project APPLE, administered by the Parsippany-Troy Hills School System.

The basic concept for the Computer-Based Resource Unit is the organization and integration of curriculum materials under five major components: learning objectives, content, activities, measuring devices (referent criteria), and a list of annotated materials such as books, films, monographs, simulation games, etc. Once the materials have been prepared in these categories, they are coded to a variety of learning interests and skill levels and related directly to specific learning objectives. The learner variables allow for coding to mental age, reading levels, a variety of interest areas, and certain developmental capabilities. This method of curriculum preparation required a great deal of training on the part of the staff, but once entered into, provided an organizational pattern within which to systematically pursue the basic criteria.

The agreement with Buffalo joined new material to an experimental delivery program, bearing the additional advantage of being able to make the curriculum units available in several states simultaneously.

ADVANTAGES OF CBRU FORMAT AND DELIVERY SYSTEM

The underlying principle of the Computer-Based Resource Unit system is that it allows for teachers, working with their students, to select objectives for the classroom from a long list of alternatives. Once the teachers and pupils have decided on the objectives, the teacher completes a form requesting a configuration of materials related to the objectives chosen and to the variables selected by the teacher. For instance, the form may record the reading levels of the class, and, together with other variables, these will key the computer for a selection of material that applies to just those areas requested. When this relatively simple form is completed by the teacher, it is mailed to a processing center where it is quickly converted onto punch cards from which the guide to be sent to the teacher is then produced. From start to finish, however, the teacher is the final decision maker. Each Computer-Based Resource Guide ordered by the teacher is comparatively inexpensive. It can be used in a variety of ways for large and small group instruction or for individual instruction. If a teacher wishes, he may receive with his own guide, individual guides, printed with a student's name, containing material for objectives of special interest to that particular student. The material does not prescribe a method of presentation and is adaptable to the teacher's own methods, although the CBRU format and development possesses particular advantages as a resource in individualized instruction.

Prudently, the Council made wide use of classroom teacher input in the construction and development of each Computer-Based Resource Unit. Teacher committees organized across the state assisted in developing activities for young people in grades K-12. Since it is almost impossible to identify an "average" teaching style, Computer-Based Resource Guides have greatest dimension in teacher-pupil planning. Individualized instruction, remediation and enrichment, may be used in the so-called "traditional" classroom as well.

Studying about the environment is a new and fluid curriculum opportunity. Environmental data change each day and new studies contain more current statistics, improved projections and fresh approaches to problems. The great advantage of the Computer-Based Resource Unit Delivery System is its susceptibility to revision. New materials can be added and old ones removed without the interminable lag associated with updating a textbook. This feature alone would make the CBRU an attractive alternative in future curriculum planning. It also means that new curricular foci can be incorporated in the CBRU system as soon as their need is felt. For instance, across the country, a number of other curriculum writing projects and research groups are exploring the addition of units in such areas as ethnic studies, career education, vocational education, and health education.

THE ENVIRONMENT AND THE QUALITY OF LIFE SERIES

A recent M.I.T. publication entitled *Limits to Growth* by Meadows, *et al.*, which formed the basis of the Club of Rome Report on the Predicament of Mankind, became also the basis for the Council's consideration of problem areas to be explored in the initial development of Computer-Based Resource Units in Environmental Education. Beyond the exposition in *Limits to Growth*, the Council sought the advice of numerous environmental interest groups around the country and embarked on the development of fifteen units which should provide a basis for interesting and lively classroom content and activities for youngsters in the schools across the nation. A listing of the units which are available to teachers and in the development stage follows:

Environment and the Quality of Life: Population

Environment and the Quality of Life: Natural Resources

Environment and the Quality of Life: Industrial-Economic Impact

Environment and the Quality of Life: Pollution

Environment and the Quality of Life: Land Use

Environment and the Quality of Life: River Basin (Case Study)

Environment and the Quality of Life: A Pine Barren (Case Study)

Environment and the Quality of Life: Wetlands (Case Study)

Environment and the Quality of Life: Energy-Technology

Environment and the Quality of Life: Energy-Society

Environment and the Quality of Life: Energy-Transportation

Environment and the Quality of Life: Primary Ecology

Environment and the Quality of Life: Environmental Law

Environment and the Quality of Life: Food—The Coming Crisis

Environment and the Quality of Life: Decision Making for the Coastal Zone (in development)

Several of these units were available to teachers during 1973-74. Building on the close to 10,000 teachers who have received training in CBRU's, the Council anticipates that 15,000-20,000 teachers will use the curriculum during ensuing academic years.

Beyond the numbers involved, the key to the success of these materials is the skill of the teacher in planning and ordering objectives with students and in cooperative selection of the activities in which the youngsters will engage.

RESPONSE TO CURRICULUM AND FUTURE PLANNING

The Council's original operation plans projected completion of curriculum development during 1973-1974, and large-scale teacher training in 1974-1975. Basic changes in funding plans from the United States Office of Education required that this schedule be overlapped. As a result, the training phase was initiated in 1973-1974. Though this had certain disadvantages—the enormous demand created for CBRU's threatened to outstrip the modest computer capability set up to serve a pilot audience—there were also some uncalculated advantages. This training year allowed a testing of the delivery system which produced valuable insights for a larger scale operation, and since these insights were gained early, they were applied to operations in the ensuing year without time lag.

All of the units were field-tested before the contents were converted to computer language and stored in the computer. As the units began to be mass produced, several experimental/control testing situations were established throughout the state and, in addition, a response questionnaire was mailed to each CBRU user.

The evaluation program was targeted toward the following objectives:

1. Students exposed to the project's curriculum materials will demonstrate significant cognitive gains in their environmental awareness.

2. Students exposed to the project's curriculum materials will demonstrate significant affective gains in their environmental awareness.

3. The project's curriculum products will result in significant savings of teacher planning time, changes in teacher style in the direction of individualized instruction and commitment to continue use of the products based on their effectiveness in meeting teacher needs.

4. The project's teacher training program, conducted in 70 percent of New Jersey school districts, will be judged effective by the teacher participants.

Criteria and standards for measuring progress were established, and an evaluation design was created. A brief summary of this design with its expected outcomes, evaluation measures, and minimum performance standards appears below:

Outcomes	Measure of Effectiveness	Performance Standards
Student Cognitive Growth	Syracuse Environmental Awareness Test (SEAT)-Cognitive Test	A minimum significant difference at the .05 level between experimental and control groups.

Outcomes	Measure of Effectiveness	Performance Standards
Student Attitudinal Change	Magi Student Attitude Inventory	A minimum significant difference at the .05 level between experimental and control groups.
Teacher Time Saved in Preparation of Instructional Unit	Teacher Response Scale	A minimum significant saving of time at the .05 level.
Teacher Shifts in Instructional Methods to More Individualization	Comparative Teacher Rating of Instructional Methods (Before-After)	A shift to more individualization in each method by a minimum of 60% of surveyed teachers.
EE Materials Meeting Teacher-Student Needs	Rating Scale	A minimum teacher rating of 4.0 on a six-point scale.
Commitment to Continue Use of EE CBRU's	Opinion Questionnaire	A minimum of 70% affirmative responses.
Teacher Training in Public School Districts	Training Logs	A minimum of 70% of New Jersey public school districts trained.
Training Adequacy	Teacher Questionnaire	Favorable response from a minimum of 70% of surveyed teachers.

Results of the evaluation program which involved several hundred secondary school pupils in classrooms at various locations across the state in experimental/control teaching situations are published as part of the Final Project Report on file in the Title III, Section 306 Office in the U.S. Office of Education. This Report also includes data presented in a number of tables which display the results of the analysis of some 500 teacher-response questionnaires.

An abstract of the several evaluation reports prepared for the U.S. Office of Education indicates that the Council was effective in its innovative efforts, as supported by the following conclusive statements, based on the evaluation data collected:

1. In tests administered to ascertain students' cognitive gains, the levels of attainment yielded highly significant statistical results indicating that students in experimental groups, where teachers used Environmental Education Computer-Based Resource Units, learned more than students in control groups.

2. The objective cited for affective gains was likewise reached. In two of the three experimental groups where teachers used Environmental Education Computer-Based Resource Units, the experimental groups tested out at an extremely high level. The third experimental group test results indicated a gain, but not at a statistically significant level.

3. On a questionnaire returned by teachers who used Computer-Based Resource Units, the teachers' reactions and evaluations far exceeded the project's stated criteria. Teachers claimed that the use of Computer-Based Resource Units saved time, enabled them to change their teaching styles, and was effective in individualizing instruction. Teachers indicated they plan to continue using Computer-Based Resource Units. They also expressed their satisfaction with the project's training program and materials.

The Computer-Based Resource Unit program, as designed for teachers who wish to engage in teaching about environmental problems and issues, really works. About this, there is no doubt. It was an expensive program to develop, but it is a relatively inexpensive program to operate. The program allows for large group and small group teaching and above all provides for individualization of instruction.

Through the assistance of the Northeast Environmental Education Development Consortium (NEED), the Council has introduced the CBRU Environmental Education program into the six New England states plus New York and Pennsylvania (member states of the NEED consortium). State Department of Education officials representing these states have agreed to cooperate in additional evaluation of the curriculum materials and the delivery system. Several graduate students pursuing the Doctoral degree are compiling data to be used in the evaluation program and these data will be used to satisfy their respective dissertation requirements.

Plans are underway for introducing the Environmental Education Computer-Based Resource Unit program in California, Michigan, Wisconsin, several states served by the Tennessee Valley Authority, and South Dakota.

It is anticipated that these new Environmental Education curriculum materials, developed in New Jersey, will be used extensively across the country and eventually will be translated into several other languages such as Japanese and Spanish for use throughout the world.

CHESAPEAKE BAY FOUNDATION PUBLIC EDUCATION WORKSHOPS

by F. Samuel Bauer*

Turn-of-the-century conservation groups and bureaus tended to identify relatively simple abuses and urge relatively unilateral solutions. But their growing insights and energies led in the 1920's to the founding of what can be called the nation's "first true citizen action environmental organization," when 54 devotees of the outdoors met in Chicago to "call a halt to water pollution" under the banner of the Izaak Walton League of America. The educational message of those early Waltonians was strikingly modern: "Environmental influences control all life development. They determine where the brook trout shall swim, where the whip-poor-will shall sing, where the violets shall perfume the atmosphere. In the city, environmental influences are the hindrance to a higher mental and physical development of man, and determine which of us shall end our career in hospitals for incurables—or, in prison."

Today such organizations as the IWLA have effective new allies, like the hardhitting educational materials coming from David Brower's rebel Friends of the Earth, the brass-knuckles media campaigns conducted by Environmental Action, Inc., against its annual "dirty dozen" list of Congressmen with poor environmental platforms, the savvy briefs filed by the Environmental Defense Fund around the country, and the Wilderness Society, now 111,000 strong after a 1935 start with nine. As Thurman Trosper, recent president of that Society, has said simply, "Our mission is education, . . . We try to work quietly with individuals at the grass roots, with dedicated citizen leaders."

In many respects the most diligent practitioners of environmental education in recent years have been the less formal citizen groups that have sprung up like mushrooms after a spring rain at community, regional, and state levels in response to environmental concerns. While these associations tend to be sharply local-issue-oriented, and often lack firm funding, they nonetheless represent the unique dynamism of American volunteerism applied to education for public awareness and action.

The York, Virginia Chapter of the Chesapeake Bay Foundation is representative. This case study reports on its series of public workshops focused on the environmental, social, and economic aspects of offshore oil development on the Eastern Shore. The author analyzes frankly the strengths and weaknesses of such a one-shot program, and looks ahead to potential spin-offs.

**Dr. Bauer was Chairman of the Workshop Committee, Chesapeake Bay Foundation, York Chapter, Inc., P.O. Box 643, Yorktown, Virginia 23690, and teaches at Christopher Newport College, Newport News, Virginia 23606. This case study is abstracted from the final project performance report to U.S. Office of Education, Office of Environmental Education.*

Chesapeake Bay Foundation, York Chapter, Inc., has over the years been involved in a number of public education efforts, usually in the form of forums or symposia. With the single exception of the project described below, they have been performed entirely with internal personnel and financial resources.

For this project, a P.L. 93-278 minigrant (Grant G007500689) of $7000 was received in June 1975 from the U.S. Office of Education, Office of Environmental Education. The report below is based upon the Final Project Performance Report, submitted at the conclusion of the project to the Department of Health, Education and Welfare.

The objectives put forward in the proposal for this grant were: "to attempt to inform those attending of some of the environmental, social, and economic implications of coastal oil exploration and development." This was to be undertaken by the presentation of workshops scattered around the target area, Southeastern Virginia, which is expected to experience considerable impact from the development of Outer Continental Shelf (OCS) oil off the mid-Atlantic coast. The goals for those attending were: "these workshops will attempt to lead the participants into their own analysis of the costs and benefits of such development, with an emphasis on particular problems of the local area."

Three workshops, nearly identical in subject matter, were presented. The geographical area of Southeastern Virginia was covered by holding workshops in Newport News (Peninsula area), Virginia Beach (Southside Tidewater area), and on the Eastern Shore at Melfa, Virginia. These locations allowed all citizens in the region relatively easy access to a workshop.

The workshops stressed the three impacts indicated as objectives, namely the environmental impact, the social impact and the economic impact of OCS development. The approach used was to obtain speakers from all levels of government, as well as from the private sector, to explain the laws, planning, regulations and procedures involved in the development of OCS resources. Considering all three workshops, three presentations were made by representatives of the Federal Government, thirteen by State Government officials (including control agencies), three by local officials, four by academicians, one by an environmental author, and three presentations by the oil industry.

The presentations of all speakers were well received by the participants, and the schedule followed allowed time for both formal and informal question and answer periods. Each program included oral presentations (some with slides), films and a panel discussion.

Study of the three workshop programs shows that other topics which directly involve the very nature of the OCS impacts such as the National Energy Policy, and Coastal Zone Management, were covered as well as the experiences in Scotland with the development of the North Sea oil fields, and the physical processes of oil drilling as illuminated by the Oil Industry representative.

Hence the participants in each workshop were exposed to a day of rather intensive lecture and discussion on all aspects of OCS oil development. It is our feeling that the workshops exceeded the original objectives outlined in the proposal.

Since we felt that each participant should be given as much information as possible in the form of written literature, we expended great effort in compiling a folder containing literature from environmental groups, the oil industry, and state and federal regulatory agencies. We received excellent cooperation from many groups and were able to amass an impressive folder of information.

It was agreed that the literature contained in the folder would allow the participant who was not well versed in many of the concepts and programs discussed in the workshop to gain a working knowledge of such concepts and programs. Comments received from participants stressed the value of the folder concept.

As an outgrowth of our experience with these workshops and the knowledge gained from the presentations, Chesapeake Bay Foundation, York Chapter Inc. has decided to follow up the interest generated in OCS development impacts by putting together a slide/lecture presentation which will be, in effect, a summary of the workshop proceedings. Several members of Chesapeake Bay Foundation, York Chapter Inc. will then be available to local civic, church and political, environmental, and governmental groups for the purpose of presenting the slide lecture and leading discussion on OCS impacts.

We have no reason to believe that the original goals (objectives) were and are not conceptually and operationally valid. The Federal Government is planning to lease more of the OCS off New Jersey and then down the East Coast. Brown and Root, a major onshore fabricator of drilling rigs, is fighting to get permits to build a fabrication plant at Cape Charles, Virginia, at the lower tip of the Eastern Shore. A new refinery is planned in Portsmouth, Virginia, and if built (it is being opposed by EPA and several other Federal and State environmental agencies as well as by many citizen environmental groups) will welcome new domestic oil production. The impacts discussed in the workshops are there, but they are far enough away in time that it is difficult to get the populace interested.

The greatest disappointment that we had was the attendance at the workshops. Press releases were sent out eight weeks before the first workshop, and were followed up at regular intervals. The local press cooperated with us and gave us very good free coverage. In addition, we spent $548.52 on direct newspaper and radio advertising. In addition, we compiled mailing lists in all three target areas and mailed over three thousand programs with registration cards to local government officials, civic groups, local chambers of commerce, environmental groups, etc. All of this effort netted a total attendance at all three workshops of less than one hundred individuals.

In retrospect, perhaps Saturdays in April are a bad time to ask people to attend workshops. Each day was clear, warm, and beautiful as only spring can be in Tidewater, Virginia, and we feel that this surely affected our non-reservation attendance. Also, after we scheduled our workshop on the Peninsula (April 3) the local Democratic district convention was scheduled and many reservations were withdrawn due to this conflict.

The above factors notwithstanding, the primary reasons for the lack of interest in our workshops must be in a word, apathy. As one of our members quipped after the first workshop, "We have tapped a rich vein of abject apathy." Apathy toward environmental issues on the part of the public is by no means a unique experience for any environmental group to face; however, in view of the time, expense and quality of the workshop experience we offered, we were most disappointed. We can take some solace in knowing that those who did attend found the experience to their liking and many have asked us to carry on with the slide lectures mentioned above.

Finally we can predict that when the first direct impact threatens Tidewater, Virginia, there will be a great hue and cry that nobody predicted or discussed it. It is unfortunate that such is the nature of man.

Hindsight being 20/20, the workshop approach was probably not the best choice of media. Our difficulty was getting citizens and officials alike to commit one Saturday for our workshop. Perhaps the follow-up approach that we are now developing, that of having a "package" slide lecture available for any group that requests it, would have been a more efficient vehicle for the dissemination of the ideas we developed. The downfall of this method is, however, that it is difficult or impossible to have the scope and expertise of the speakers we used in the workshops. The speakers at the workshops were able to explain their roles in OCS development on a firsthand basis, and any use of "second hand" information in the slide lecture format will have much less impact on the audience.

A comment on community attitudes toward environment is appropriate here. Tidewater, Virginia is "blessed" with what the citizens have always considered an ideal environment of clean air and water. However, several events have occurred since the workshops were given to raise the awareness of the citizenry to the fact that really our environment is seriously threatened. The matter of the contamination of the James River and the lower Chesapeake Bay by the pesticide Kepone is now an ecological crisis of major proportion seriously affecting the seafood industry. Revelations by EPA concerning the air pollution levels in Hampton Roads came to the surface during testimony on the proposed Portsmouth Oil Refinery. EPA has recommended to the Corps of Engineers that permits for the refinery not be granted. Two barge disasters in the lower Bay, one oil and one sulphuric acid, have raised the concern of citizens. All this points up to what was stated earlier (and is generally held among environmentalists) that the populace does not wake up until it is directly and disasterously affected. It would seem reasonable to speculate that if the workshops were to be given this fall (1976), more citizen interest could be spawned.

The Chesapeake Bay Foundation, York Chapter, Inc. is greatly indebted to many people and organizations for their cooperation in producing workshops of such a high quality. In all but a few cases, the individuals participating in the workshops offered their time and efforts gratis.

Of special help was Dr. Charles Coale of Virginia Polytechnic Institute and State University. Dr. Coale and his colleagues, Dr. Batie and Dr. Shabman, contributed under the support of the Citizens Program for the Chesapeake Bay, Inc. (a group to which Chesapeake Bay Foundation, York Chapter holds membership) and a grant under Title I of the Higher Education Act of 1965, Community Service and Continuing Education (Project 73-013-019). Dr. Coale and his colleagues supplied copies of the booklet Chesapeake Bay: Uses Choices and Conflicts, as well as moderating the panel discussion at each workshop.

We also received support in the form of pamphlets from the National Oceanic and Atmospheric Administration (NOAA), Office of Coastal Zone Management, and the now defunct Division of State Planning and Community Affairs of Virginia, Commerce and Resources Section.

Exxon Corporation and the Shell Oil Company both contributed pamphlets for our folder, and we are indebted to Frank Bedell of the Virginia Petroleum Institute for arranging the appearance of the oil industry representatives.

We also appreciate the contribution of the keynote speakers, State Senators Bateman and Gartland and Secretary Shiflet of the Virginia Department of Commerce and Resources. The State Department of Planning and Community Affairs also contributed speakers. We also received much help from the Virginia Marine Resources Commission and are especially indebted to Commissioner Douglas and his assistant, Mr. Larson.

Ed Wilson of the Virginia OCS office did spartan service, appearing in two workshops, and Gerald McCarthy, Executive Director of the Virginia Council on the Environment, assisted in the program as well as providing other support.

We thank Mr. Frank Basile, Manager of the New York OCS Office of the Bureau of Land Management, Department of the Interior. Mr. Basile appeared at all of the workshops and contributed greatly to their success.

Finally, Chesapeake Bay Foundation, York Chapter wishes to recognize the aid of the individual who made the most significant contribution to the success and quality of the workshops. This individual, George Hagerman, who has recently been selected to replace David Favre as President of the Conservation Council of Virginia, served as Coordinator for the workshops. The Workshop Committee (H. A. Ross-Clunis, Mr. Favre, and Dr. Bauer) found, soon after planning for the workshops began, that it needed the services of an individual who was knowledgeable with regard to the people and organizations in the state and Federal Government who could furnish resources for the workshops. Mr. Hagerman was recommended

to us and brought with him an extensive knowledge of the resources and contacts we needed. His experience included being a staff member of the State Air Pollution Control Board, and organizer of several statewide Symposia on various environmental problems.

Mr. Hagerman gave virtual full-time service during the critical planning months, working with the Workshop Committee and doing the "leg" work that would have been impossible for the members of the committee to do effectively in their non-working hours. The quality and depth of the workshop presentations and the excellence of the arrangements would have, in retrospect, been impossible without the contribution of Mr. Hagerman, who worked well in excess of his employment conditions. The Chapter stands deeply indebted to Mr. Hagerman for his excellent services.

In order to evaluate the utility of the workshops, a questionnaire was distributed to the participants at the end of each workshop. Nothing in the questionnaire merits the term "innovation"; however, the form served to give us data on the usefulness of the program to the participants. Thirty-two (32) forms were returned, hence about thirty (30) percent of the participants responded. Of this sample of 32, 31 - or all but one - respondents indicated a "yes" response on Question 1, which is the only quantifiable item in the form. The respondents made many useful and cogent suggestions, and generally offered encouragement and kudos for our effort. A copy of the questionnaire is reproduced as Appendix I.

APPENDIX I: WORKSHOP EVALUATION FORM

WE WOULD APPRECIATE YOUR COMMENTS AND EVALUATION OF THIS WORKSHOP. WE ASK THAT YOU FILL OUT THE FORM BELOW AND DEPOSIT IT IN THE BOX NEAR THE EXIT, OR MAIL TO:

Chesapeake Bay Foundation, York Chapter, Inc.
P.O. Box 643
Yorktown, Virginia 23690

1. Was this workshop a valuable educational experience? __Yes __No

   If your answer was no, why?

2. Please list any topics which you think should have been covered, but were not.

3. Please make any comments which you think appropriate.

APPENDIX II: DETAILED FINANCIAL BREAKDOWN

RECEIPTS

Federal Grant Funds	$ 7,000.00
Program Incomes (registration fees)	475.00
Total	$ 7,475.00

OUTLAY

Printing and Supplies	$ 619.43
Secretarial services, postage, communications, mileage and film rental	1,527.75
Advertising for workshops	548.52
Facilities rental	242.88
Coordinator	2,000.00
Honoraria and speakers' expenses	380.45
Total	$ 5,319.03

RETURN TO USOE (unexpended)	$ 2,155.97

MAINE ENVIRONMENTAL EDUCATION PROJECT

by Dean B. Bennett*

If any environmental education program can be said to be a model worthy of consideration for wide replication, the Maine Environmental Education Project would have to be one candidate. It links formal K-12 instruction with formal teacher preparation. It features a state network of locally funded programs allied with a central demonstration program. It builds on rather than substitutes for existing curricula in diverse school districts. Its per-pupil costs are low. It has proven effective in heightening pupil awareness of the role of humankind in maintaining and improving the quality of the total environment. And it is readily "exportable". This case study is an objective evaluation of "the Yarmouth idea."

The Maine Environmental Education Project was a five-year program commencing with State Title III funds in April, 1970, and terminating as a Title III, 306, National Developer/Demonstration Type 2 project in 1975, directed toward formal education effort at K-12 and teacher education levels, both undergraduate and graduate. The project in a large measure gave impetus to the development of the Maine State Plan for Environmental Education. The plan in turn resulted in a combined University and State educational agency environmental education position which now has assumed much of the work of the project.

GOALS AND OBJECTIVES

The Maine Environmental Education Project viewed environmental education as:

1. a process aimed at producing a citizenry that possesses that knowledge, motivation, and ability to maintain and improve the quality of the total environment for all life, and

2. a process for improving the quality and effectiveness of educational practices at all levels in all disciplines.

Two kinds of areas of objectives were identified to achieve these two goals: Statewide Program Implementation Objectives and Learner-Oriented Objectives.

Dr. Bennett is Environmental Education Consultant, State Department of Educational and Cultural Services, Augusta, Maine 04333, and was director of the Maine Environmental Education Project.

Statewide Program Implementation Objectives

1. To establish a wide geographic network of K-12 locally funded programs with trained coordinators.
2. To establish programs with curriculum emphases in other communities throughout Maine.
3. To establish graduate, undergraduate and inservice teacher education programs and courses within the State University System which are approved by the State Department of Educational and Cultural Services.
4. To strengthen the project through outside contacts.
5. To develop an innovative teacher-learning process and related activities for classroom and first-hand community total environment studies.
6. To develop and test a practical evaluation model for assessing student outcomes.
7. To demonstrate the Project's approaches and materials nationwide.

Learner-Oriented Objectives

1. The student will continually seek to discover and investigate the components and characteristics of his total environment and the relationships of man with this environment.
2. The student will develop and apply criteria to evaluate the data related to his total environment and associated human processes and identify opportunities for maintaining and improving his environment.
3. The student will participate in selecting and carrying out environmental problem-solving activities involving the prevention and resolution of environmental problems and the creation of components to enhance the function and quality of the environment.

CONTEXT

The State of Maine was served by the Project. Maine has several urban areas but is predominantly rural in character with relatively small communities. Many of the state's towns have formed school unions and school administrative districts made up of two or more communities. Other towns and larger cities have individual school departments.

Demonstration environmental education programs with coordinators were established in rural school districts and in suburban and urban school systems. These school systems range in size from 1200 students to over 6000.

PROGRAM DESCRIPTION

The project involved over 15,000 students all in completely locally funded environmental education programs with coordinators trained by the project. One locally funded program was designated as the model program—The Regional Environmental Education Program in the Yarmouth area. This program was established and funded by four school systems in 1968—two years before the Title III statewide program.

The first year was primarily a coordinator development and training year in preparation for the establishment of the network of satellite programs. During the year a resource center was developed at the Yarmouth model program site. The director was paid one-half time during the first year.

During the second year the trained coordinators were re-employed by their school systems after a year's leave of absence and began the planning and implementation of their programs. Project staff paid for by Title III funds included a full-time director, full-time field consultant, and secretary. In addition to providing consultation and resources to the satellite programs, the staff began to work with other school systems throughout Maine through meetings with school and community citizens, teacher inservice workshops, etc. A complete set of program development guidelines were produced. A special masters degree training program for additional coordinators was established at the University of Maine at Orono. A process approach and related methods and activities were developed and refined. A special inservice course for teachers was developed and pilot taught.

During the third year one additional coordinator-implemented program was established. The staff expanded its assistance to other schools in Maine. A course was developed and piloted for inservice teachers and community conservation commission members to identify community resources and develop curriculum. A program for pre-service teachers was developed and tested in cooperation with the University of Maine at Portland-Gorham. In addition, an evaluation model was developed and data were gathered under controlled conditions to test the process approach.

During the fourth year the school/community approaches were further refined. A special one-day workshop and follow-up inservice course along with special techniques were developed, advertised and trial tested. Project staff during the year was reduced to a director and secretary. The project took an active role in completing the State Environmental Education Plan for Maine. Much consultation and dissemination was undertaken to assist schools in Maine establish programs.

Considerable time was spent in phasing the project into a permanent institutional setting within the University System and State Department of Educational and Cultural Services.

In the fifth year, the Maine Environmental Education Project was funded under Title III, Section 306, as a Developer/Demonstration Project. As such, the project was engaged in (1) the revisions and testing of its approaches and materials, and (2) their demonstration in workshops in Maine as well as throughout the United States for teachers, administrators, and state agency specialists. It was also working closely with its model program in Yarmouth, Freeport and Cumberland-North Yarmouth schools, and with a specially funded Title III, 306, adopter program in the Calais, Maine school system. During this time the directorship was shared with Wesley Willink who previously had directed the project's model program in the Yarmouth area.

One additional note should be mentioned concerning the involvement of community citizens in the project's programs. The project stressed throughout its operation the linking of the school and community. This linkage occurred through not only the focus on the community environment but perhaps more importantly through the participation of local people who served as resources for the programs. The model program had between 40 and 50 citizens each year involved in the planning and implementation of educational activities. They gave classroom presentations, led field trips, developed instructional materials, assisted in site development, identified community problems, etc. Each of the other satellite programs worked with community people in similar ways.

COSTS

The first year of the project was primarily a coordinator development year for the project satellite demonstration programs along with establishment of a resource center located at the Yarmouth area model program. The demonstration programs with their trained coordinators were considered crucial to the stimulation of future programs in Maine. The project gave a stipend to the four trainees covering their salaries, tuition, travel, and other expenses for a year of study at the University of Michigan.

During the second year of the project the trained coordinators were re-employed by their respective school systems to begin program implementation. The principal costs to each school system included the coordinator's salary, office expenses, travel and field trip transportation. The project provided each program with $4500 for materials and equipment and follow-up consultation from the director and a field consultant.

The major cost for the coordinator-supervised programs after installation was the coordinator salaries. All satellite demonstration programs were operational by local funds which covered the coordinator salaries.

The project also became involved in the development of programs operating through classroom teachers with citizen assistance and support. Such programs may be of little expense to a school system but are not as effective as those with employed coordinators.

Developmental costs for the entire project's initial demonstration effort were an average of approximately $7.00/pupil/year over a four-year period (includes training of coordinators). For a school system considering a program with a coordinator it is estimated that start-up costs would be about $5.50/pupil/year, and $3.75/pupil/year for continuation, depending upon the size of the system.

Approximate average program cost per pupil for the satellite and model programs is as follows:

Yarmouth Regional Program	$ 3.45
Bangor	1.80
Kennebunk-Kennebunkport	5.00
Oxford Hills	4.12

EVIDENCE OF EFFECTIVENESS

Prior to the current year, evidences of effectiveness were based upon the following objectives:

Evaluation of Student Outcomes Objective

1. As a result of participating in environmental education experiences developed by the project, students will increase in their ability to investigate, evaluate and solve problems related to their environment as evidenced through the application of a pre-post test.

Evaluation Technique and Results

The work of the project in evaluating student outcomes has been primarily directed at the development and testing of an evaluation model and strategy. It has been tried and tested with two classes of students—grades six through eight (approximately 50 students)—participating in a unit involving the educational process and learner-oriented outcomes described earlier. As a result of the education experience, students in the experimental group showed significant improvement at the .05 level in their ability to evaluate their environment and identify problems (an increase of 7.5%) and in their concept of the role of man in maintaining and improving the quality of their total environment. An even greater percentage increase (10.9%) was noted in problem-solving skills. No change was detected in discovery-inquiry skills. These changes were predicted since the school traditionally stresses the acquisition of data (discovery-inquiry or investigation) but too often does not emphasize the evaluation of data and problem-finding and problem-solving processes.

Reliability determination procedures involved comparing pretest/post-test scores of experimental and control groups. Validity checks were built into the testing design—the Solomon four-group design. Through this design most threats to internal and external validity are removed. Content validity was assessed by a panel independently rating each question. Further information on the evaluation study of the project may be obtained from the following sources:

1. University Microfilms, Inc., The University of Michigan. Doctoral dissertation by Dean B. Bennett, The Development of a Model to Evaluate the Attitudinal and Behavioral Goals of K-12 Environmental Education, #73-6791, and
2. Chapter VIII, "Evaluating Environmental Education Programs," in Environmental Education Strategies, edited by William Stapp and James Swan (Sage Publications, 1976).

Evaluation of Program Implementation Objective

As a result of project activities:

1. a statewide network of locally funded environmental education programs will be established under the direction of trained coordinators,
2. effective environmental education curriculum and teaching methods will be developed, and
3. practical workshops and courses for inservice teacher education will be designed.

Evaluation Technique and Results

This objective was evaluated by a State Title III Team and a National Office of Education Validation Team with the following results.

The evaluation of the program implementation objectives by the State Title III team resulted in consistently high evaluations. Especially noted was the project's development of a practical model for integrating environmental education into ongoing K-12 curricula in diverse districts in Maine; the model also has potential for national application as well.

Below are selected summary comments from the four annual evaluation reports submitted by the State Visitation Team:

1. "Early recognition of and organization for environmental education on a regional and statewide basis."

2. "Establishment of a systemized adoptive and holistic approach to environmental education which includes diverse and disparate groups."

3. "The Maine Environmental Education Project has developed a practical model for integrating environmental education into ongoing curricula, K-12. The model was purposefully designed for inclusion into the existing curricula of diverse districts throughout the state and region, but would apply nationally as well. Specifically, the model includes the following processes:

   a. "provides a well-defined interdisciplinary teaching method for:

      - concept formulation
      - values education
      - critical thinking and behavioral processes related to inquiry, evaluation and problem solving

   b. "emphasizes the linking of school and community by focusing on the students' immediate surroundings and the local environment

   c. "encourages schools and teachers to identify their own needs and offers services to help them meet those needs."

During the third year of the project it was nominated to be evaluated in the U.S. Office of Education's National Identification/Validation/Dissemination Program. After a thorough inspection utilizing an evaluation instrument and an on-site visitation team of four trained evaluators, the project was given a rating of 95 on a 100-point scale. An 80-point minimum rating was required for validation. High ratings were received in the four categories of: (1) Innovativeness; (2) Effectiveness/Success; (3) Cost of Effectiveness; and (4) Exportability. As a result of this evaluation, the project was one of 107 selected from among more than 2000 Title III projects in the country as worthy of replication and adoption by other school systems.

TOTAL EDUCATION FOR THE TOTAL ENVIRONMENT: THE PROGRAM OF THE FIRST NATIONAL CENTER FOR ENVIRONMENTAL EDUCATION, THE PINCHOT INSTITUTE FOR STUDIES IN CONSERVATION

by Matthew J. Brennan*

Where and how environmental education was born, and who presided at its birth, can never be completely documented in any definitive way, but it is a cinch that playing a stellar role in the story were Matt Brennan and his associates in the Pinchot Institute for Studies in Conservation at Milford, Pennsylvania, in the period 1963-70. Unquestionably, early in the game Dr. Brennan, his sponsors, and his colleagues had a clear sense that conventional conservation education had failed, and that what was needed was something quite different in concept, content, scope, and objectives. They called it as early as 1964 "total education for the total environment," and they projected programs of research, development, and dissemination to refine and spread the new word. Out of this pioneering effort were to come conferences and reports on "Future Environments of North America" and "The Future of Education for the Environment," a national youth conference on conservation and natural beauty, a meeting antecedent to the Alliance for Environmental Education, a planning meeting that eventuated in the UN Conference on the Human Environment at Stockholm, textbooks, and the curriculum guides "People and Their Environment." Ironically, after laying the groundwork for the rise of environmental education country-wide, the Pinchot Institute itself was closed in March of 1970 for lack of funding, even as Dr. Brennan was testifying before the Brademas Committee in Washington on the need for federal support for environmental education. But the Pinchot Institute-Brennan spirit lives on, as attested in this remarkably prescient case history of men and women who had a better idea.

On September 23, 1963, President John F. Kennedy came to Milford, Pennsylvania to dedicate the Pinchot Institute for Studies in Conservation, the first stop on his last conservation tour of America. He called it "a journey to save America's heritage—a journey to preserve the past and protect the future." President Kennedy thought it fitting that his trip should start at the ancestral home of Gifford Pinchot, the birthplace of conservation in America. In his dedication address, he said, "Pinchot's contribution will be lost if we honor him only in memory. It is far more fitting and proper that we dedicate this Institute as a living memorial. By its very nature, it looks to

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**Dr. Brennan, Founder and Director of the Pinchot Institute, 1963-1970, is currently Consultant to the Lee County Environmental Education Center, 2266 Second Street, Fort Myers, Florida 33901.*

the future instead of the past. It is committed to meeting the changing needs of a changing era."

Purpose

The Institute's purpose was to illuminate a construct of an environment in which man lives in harmony with the environment and all of life; to consolidate, extend and disseminate that knowledge by which people could attain the understandings and skills, develop the attitudes and values, and regain the hope that man will return to his rightful place of responsibility for other men, other lands, other resources, in an attempt to hasten a world community of generosity toward the land and the resources men use to live and fulfill themselves.[1]

Needs

Man had come face to face with the most serious problem yet encountered—the total destruction of the planet earth environment. During the few short years of man's existence, age-old equilibriums had been upset. Man had subjugated the land; claimed its renewable resources; used its non-renewable resources at a reckless rate; even invaded the "inexhaustible" resources of air and space; and had multiplied beyond the capacity of the earth to support his numbers. The problems are new. We called them the "P" problems—population, pesticides, pollution, power, and the increasing poverty of the environment due to pressure on resources and space. It was evident that unless people understood these problems and their consequences, man might soon be locked in mortal struggle for space in which to live, for fresh air to breathe, for fresh water to drink, for fuel to power his body and his machines; in short, for an environment fit for life and fit for living.

If man is the only organism which can consciously transform, manipulate, control, preserve, or destroy its environment, then a knowledge of how he transforms, manipulates, controls, preserves, or destroys his environment, and the consequences of these actions should be an essential element of human understanding. It is not, and this represents a failure of American education. For man, in common with all living things, is the product of his heredity and his environment. The present environment is, and the future environment will be, largely determined by man and his activities. What man does, in turn, is determined by his education and the culture he develops.

To meet these needs for understanding:[2]

a. There is need for a center for the study and constant review of modern environmental concepts as they affect a world in which science and technology have tremendous impact. Toward this end we proposed to develop a national conference center at which scholars and leaders in conservation may gather to discuss policies and practice.

b. There is need for a constant review and improvement of teaching methods and practices in conservation as these methods and practices stem from knowledge arising from modern research. Toward this end we proposed to develop seminars and institute study for leading educators and teachers.

c. There is need for the dissemination of knowledge concerning content and methods of conservation to the schools and to the communities of the Nation. Toward this end we proposed to develop a center which would undertake constant review and development of instructional and educational materials, a center which would serve as a clearinghouse for instructional materials as they are developed.

d. There is need for an advanced Institute in Conservation—a center at which leading scholars can find serenity to reflect in an atmosphere of harmony between man and the environment. Toward this end we proposed to make the facilities of the Institute available to scholars.

In short, in the first decade of the Pinchot Institute, we proposed to engage in these activities:

a. Conferences on national policies and practices in Conservation;

b. Seminars on special problems—the "P" problems;

c. Courses and seminars for educators and teachers;

d. Curriculum studies in all subject areas at all levels of education;

e. Preparation of publications to disseminate the deliberations of conferences, findings of seminars and studies, and improved instructional materials as developed;

f. Construction of facilities which will assist in stimulating thought and practice in conservation, especially development of classroom, laboratory, and field facilities;

g. Development of outdoor laboratories as integral units of school facilities across the Nation;

h. Continuing reconnaissance of the Nation's resources which are the concern of many individuals and organizations, and service as a clearinghouse for their findings.

In summary, the Pinchot Institute was designed to serve the Nation's need in conservation by serving the conservationist and the teacher—by helping them to further their understanding of the art and effort required in the use of the earth's resources for the common good.

Objectives

Since it was obvious that the problems which confronted man and the environment were largely the result of lack of understanding of man's interdependence with the environment and all of life, and that this lack of understanding was a failure of American education, a wholly new approach was needed. The Institute's objective became simply to develop a strategy for education for an environment of quality. This education, which we called TOTAL EDUCATION FOR THE TOTAL ENVIRONMENT, represented such a totally new approach to education. Its objectives were:

a. development of an interdisciplinary program
b. development of a conceptual framework for curriculum
c. orientation to the new problems of the environment, the "P" problems resulting from man's activities.

Development of a Strategy for Curriculum Development

The first element in the strategy for curriculum development was a redefinition of conservation to reflect the new dimensions of the environmental problems and man's role in them. This attempt to see conservation as something far beyond the "wise use" of resources had actually begun many years earlier, when "wise use" was referred to merely as "the practices of a landowner who believes them to be scientifically sound, economically profitable, and morally and socially desirable . . . conservation is a way of life, a philosophy of living based on the natural and physical laws of science and tempered by the moral, intellectual, and social environment of the individual."[3] (This was also the genesis of the interdisciplinary approach.) The new definition of conservation was refined at the Pinchot Institute to "a recognition by man of his interdependence with his environment and all of life, and recognition of his responsibility to maintain the environment in a manner fit for life and fit for living." The objective of environmental education was obvious—to develop in man recognition of interdependence with and responsibility for an environment of beauty and bounty—an environment in which man lives in harmony. The following paragraphs (below, through page 48) were part of the rationale for establishment of the Pinchot Institute.[1,4]

"The first part of the new education involves understanding; the second involves the development of attitudes--a conservation ethic. Understanding of the environment--recognition of man's interdependence with his environment and all of life--is not easily achieved. Recognition of man's responsibility to maintain his environment in a condition fit for life and fit for living is even more difficult to achieve. Yet this is the role, the objective, of environmental education, for this is conservation in its highest sense.

"Understanding the environment and man's activities in it involves all of the sciences. Indeed, an understanding of the physics, chemistry, geology, and biology of the earth environment is basic. Yet, in our modern world, decisions regarding man's use of the environment and its resources are not often made on the basis of scientific knowledge. We have the knowledge, and in most cases, the technology, to solve most of our environmental problems—the P problems. But decisions are being made, and will be made in the future, on the basis of economic feasibility, social desirability, or political expediency. Therefore, the social sciences must be an important segment of environmental understanding. And if we are to accomplish the second part of our environmental education for conservation, the development of a conservation ethic—an attitude of responsibility for the environment —then the humanities must come within the purview of our program of education. Research tells us that the lifestyles and attitudes of most children are developed at an early age, so our education must include experiences which ennoble man and thereby ennoble man's use of the environment. The reasons why people conserve are internal, and if we fail to develop the inner environment of the child, any program of education for conservation will be useless.

"So, environmental education is concerned with the total environment of the child or adult, the external environment of his world, and the inner environment of his person. We have called it TOTAL EDUCATION FOR THE TOTAL ENVIRONMENT.

"It is most important that we recognize the interdisciplinary nature of environmental problems. Conservation education up till now has been unsuccessful because:[5]

- teaching materials were oriented to the problems of a rural society with little or no attention to the problems of a modern, man-made, urban technological society;

- there was overemphasis on biological problems—social, economic, political, or aesthetic factors influencing man's use of the environment and its resources were not considered in school programs;

- instruction in conservation was not thought of as instruction in the use of the total environment;

- our education programs do not reflect our heritage as a nation closely bound to the natural environment;

- where the environment has been studied, man has not been considered a part of it.

"Environmental education to be relevant to the modern world must be interdisciplinary. We can no longer isolate and segment our studies of the environment and environmental problems. Discussions of population, pesticides, pollution, power, and poverty of the environment are by nature interdisciplinary. It is no longer efficient to separate the scientific, social, and aesthetic aspects of the P problems, resource use and management, or the preservation of park and wilderness areas.

"The structure for curriculum development was organized around the three great conceptual schemes which govern all of life on earth, including the life of man:

1. the living organism is the product of its heredity and its environment (so also are populations of organisms);
2. living things and environments are in constant change;
3. living things are interdependent with one another and with their environment.

"We believe that our basic conceptual scheme—that the living organism, including man, is the product of its heredity and its environment interacting—has validity in elementary, secondary, and higher education. Its understanding and application have made civilization possible. We ignore this concept at our peril. Indeed, we have ignored it, and we are in peril.

"Although a conceptual approach has not been tried in education, we see several advantages of a conceptual framework in the development of a curriculum:

1. Curriculum can be approached through the development of succeeding concept levels.
2. Teachers can select planned sequential experiences to guide conceptual development in the child.
3. Repetition of experiences at various levels of education can be eliminated.
4. Conceptual schemes do not change. Problems may change, species may change, but the conceptual schemes governing life remain stable. They are as valid for the dinosaur as for man.
5. In planning curriculum development for a national audience, the conceptual framework allows local teachers to utilize local problems and environments to provide experiences for children. Thus, the final responsibility for curriculum remains in the local school.
6. Each child can be provided with environmental experiences appropriate to his level of conceptual development.

"There is one fundamental principle of curriculum development which we recognize and to which we subscribe—namely, that programs narrowly conceived—space, special health, nature, and conservation—face inevitable failure. To be successful and enduring, programs must become part, an integral part, of general education. Conceptualizations of any kind to be included in the education of children are viable only if they support the fiber of the child's life. Educators, curriculum specialists, and teachers rightly look with suspicion on any new claims on their time and the time of their children. Therefore, studies of the environment, to have scope and value, must be part and parcel of the total education curriculum, never isolated. We will never mention conservation except in our name or in a statement of our purpose. For conservation cannot really be defined. It cannot even be conceptualized. It cannot, therefore, be integrated into a curriculum. It can be added to a curriculum. But just as easily, at the caprice of any teacher or administrator, it can be eliminated. Our job will be to integrate the elements of knowledge essential to an understanding of our world so skillfully that these people will not be able to identify them and leave them out.

"Because our endeavors, whether in curriculum research, design, or development, will lead us into the heart of education, whether we consider its aims, objectives, curriculums, methods of teaching and learning, or procedures, we have deemed it essential to affiliate with a major school of education, the University of Pittsburgh, for the conduct of our course and seminar work, and to obtain credit for our workshop and seminar participants."

Program Design Objectives—Educational Research[1]

"If our approach to "total education" is to be interdisciplinary, it will be an essential first step to determine the contribution of each of the disciplines to environmental understanding; how the disciplines complement or conflict with one another, and how the conflicts may be resolved. To this end a National Task Force of leaders in all areas of education and conservation will be established to develop recommendations for the future role of education in man's understanding of his environment and the maintenance of its quality.

"We will be particularly concerned with research into curriculum patterns. Curriculums are not developed. They grow and change by custom and accretion. So we are talking of at least a ten-year program before our efforts, even if successful, will affect general education curriculums.

"We will attempt to discover whether the conceptual structures we have developed are feasible, our hypothesis being that they will give solidarity and pervasiveness to the curriculum.

"We will be concerned with the gifted learner. If the future of the earth depends on conservation as we believe, and if conservation depends on enlightened choices by all our people, as we believe, but principally by our leaders, then we must be concerned with the gifted children in our schools. For from this group will come the leaders who will develop the knowledge, the tastes, the styles, the ethics, the purposes, and the policies—in short, the mentifacts, the sociofacts, and the artifacts which will design the natural and cultural evolution of this earth and the life upon it.

"We will be concerned with research into the values which teachers and children hold about the environment. (As indicated, the total environment includes the inner as well as the outer environment of man.) Of course, we shall also try to determine how these values are developed.

"We will be concerned with research into the development of devices which speed conceptual understanding, particularly experiences, direct or vicarious, which provide encounters with the objects, events and behaviors in the environment of man."

Program Design Objectives—Educational Design [1,6]

"Whatever research and experience tell us about the basic structure of the curriculum, we shall apply to the design of the curriculums which we develop. Our feeling is that this design may be a conceptual structure, closely sequential, and fitting either graded or non-graded administrative design. A conceptual structure would permit an advance in the individualization of instruction, and this, certainly, is one of the major evolutionary educational thrusts of our time.

"We will be concerned with research into the design of a "Total Environment for Education," in school and in out-of-school community areas developed and used in harmony, believing that we cannot accomplish total education without the use of the total environment for experiences in search of meaning. To this end, we will assist school systems in different parts of the Nation acquire and develop such total environments.

"We will be concerned with research in the design of seminars involving science, social studies, and humanities cross-disciplines. Those who have been involved in curriculum revision or program committees can appreciate the difficulty in such a design. Just getting the scientists together is difficult enough."

Elements of the Program[1,4]

"Aside from the Institute activities in research and design, the primary Institute endeavor will be the development of various educational functions and devices. Much is known about valid and useful teaching methods and materials. It is strange how little of what we know is being used in environmental education. We see our task as the development of programs in which the best of education is utilized. These programs will include:

a. Conferences. We will hold conferences of national and international leaders in education and conservation to discuss policy, practice, and procedure. Several scheduled for the first year will be designed to enlist their help in the final design of the Institute's ten-year program.

b. Seminars. We will hold seminars for the examination of specific aspects of environmental studies—for example, the P problems, or trends in the use of space.

c. Summer Workshops. We intend next summer (1965) to invite the 50 state education agency curriculum specialists to the Institute for six weeks to explore with us new curriculum designs and devices. Subsequent yearly workshops will involve teachers and others who are deeply involved in curriculum and instruction in the total environment. We believe that within ten years we shall have been able to affect curriculum and instruction in a perceptible manner. At the end of that period, we would hopefully have in each state ten leaders who have attended an Institute workshop, are working within a new curriculum design, and are working on a school facility which includes a total environment for teaching and learning; in effect, ten demonstration centers in each state.

d. Development or assistance in the development of curriculums for all disciplines at all levels of education.

e. Development of instructional materials. There are vast numbers of materials which must be revised and updated. New materials reflecting the P problems and the interdisciplinary approach to their understanding and solution must be developed. This task will be easier when new curriculums require specific, relevant, and needed resource materials.

f. Library. We will establish at the Institute's main building, 'Grey Towers,' a working library for total education for the total environment as we have defined it. It will be unique in America.

g. A National Center for Dissemination. We are exploring many ideas for dissemination of the results of our conferences, seminars, and research, including use of the computer center at the University of Pittsburgh, one of the nation's largest."

Funding Sources and History

Under the terms of the charter between the Forest Service, USDA, and The Conservation Foundation which established the Pinchot Institute, the Forest Service provided and maintained the Institute facilities. The Conservation Foundation provided program funds. Funds provided by the Foundation under this charter were made available through several foundations, including the New York, Old Dominion, H. J. Heinz, Rockefeller Brothers; and many individuals, including most of the members of The Conservation Foundation's Board of Directors. The American Conservation Association was especially helpful in the funding of several special projects in addition to its contributions through The Conservation Foundation.

Funds for the South Carolina Conservation Curriculum Improvement Project, which produced the Teacher's Curriculum Guides to Conservation Education, People and Their Environment, were provided under grants from the Belle W. Baruch Foundation totaling $174,000 over a three-year period.

Special funds for a conference on the role of camping in environmental education, held in cooperation with the Amreican Camping Association at Bradford Woods, Martinsville, Indiana, were made available by The American Conservation Association.

Funds for most of the first year's operations were realized from an auction of the furniture and furnishings of the Pinchot estate which were deemed surplus to the needs of the Institute.

The Institute Board of Governors, which was given the responsibility for policy formulation under terms of the Institute charter,[7] approved an initial budget of approximately $175,000, or $2 million for the proposed ten-year program. As will be seen in the section on Institute history, money for the approved program was never made available to the Institute.

Target Audiences

As indicated in the listing of objectives, the program of the Institute was designed for all levels of education, as well as for all segments of the community involved in the educational process.

History

The history of the Pinchot Institute actually began many years before its founding in 1963. Dr. Brennan, Chief of Conservation Education for the Forest Service, and Dr. Paul F. Brandwein, Director of Education of The Conservation Foundation, had been teachers together at Columbia University in 1948-49, at the time of the founding of the Foundation. One of Dr. Brandwein's goals was the establishment of resource education centers throughout the Nation, dealing with the resources and their use and management. In 1960, he asked the Forest Service to assist in the development of a center for forestry. In that same year, Congress passed the Multiple-Use Act for the management of all the resources of the National Forests, so Dr. Brennan suggested a center for all the resources to be considered together. There had been a need for a center where all those interested in the future of the planet Earth environment might come to study, reflect, and discuss their ideas with others. The lack of a suitable facility and financial support for its operation seemed an insurmountable obstacle to its realization. Then in October, 1962, the families of Gifford and Amos Pinchot offered the Pinchot property and the ancestral Pinchot home, Grey Towers, to the Forest Service, for which Gifford Pinchot had served as chief forester at its founding.

Drs. Brandwein and Brennan immediately started the procedures which led to the acquisition of the Pinchot property, the development of the Institute's charter, the appointment of the Board of Governors, and the dedication of the Institute by President Kennedy on September 24, 1963. It seemed that it was at last possible to look forward to the establishment of a national center for environmental education.

Shortly after its dedication, the Institute program ran into difficulties:

1. With the retirement of Samuel Ordway, President, and the death of George Brewer, Vice-President and principal sponsor of the Institute, The Conservation Foundation lost the two leaders who had been responsible for the initial success in gaining public support and funding for the Institute program. The Institute was doomed before it ever got started. The new Conservation Foundation president, Russell E. Train, moved the foundation's headquarters to Washington and held serious doubts about the ability of the Institute program to achieve any of its objectives. Funds for the establishment of the Task Force, which was essential to the development of interdisciplinary studies, and the summer workshop for the summer of 1965, which was critical to the establishment of our state centers, were withheld, even though Mr. Brewer had been successful in raising them. So the program had to be started with funds available through the auction of Pinchot furniture and furnishings.

2. The first national conference, for leaders in education and conservation to initiate our research into the feasibility of interdisciplinary studies in and for the "total environment," had to be shifted to Arlie House when the renovations to Grey Towers proved to be more extensive than expected. So, the first Pinchot Institute Conference became instead the Arlie conference, which led to the report, Future Environments of North America.[8]

The second planned conference, at which educators representing the major education and youth organizations considered the "Future of Education for the Environment," was held at the "new" Pinchot Institute in August, 1965. It was organized around papers which the conferees prepared on the question, "What needs doing in education for conservation in the next decade?"

In October, 1965, a national conference on "techniques of teaching conservation" brought together the Nation's outstanding teachers, including the authors of every widely-used textbook in use in schools.

In addition to the attempts to bring together people from the various disciplines, the Institute attempted to bring together other diverse groups in its attempt to establish cooperation in the total effort for education:

1. In January, 1966, the Institute gathered together representatives (youth) of the major youth organizations to plan a National Youth Conference on Conservation and Natural Beauty, patterned after the White House Conference held earlier. This conference resulted in the conference which was held in Washington, D.C. in June, 1966, with an opening session with President and Mrs. Johnson on the White House lawn.

2. In May, 1967, representatives of the major conservation education organizations met at the Institute to consider ways to work together for "total education for the total environment." This "Summit Conference" endorsed the Institute's definitions and planted the seed for the establishment of the "Alliance for Environmental Education."[9]

3. In October, 1967, a national conference brought together representatives of the principal school architects and the principal leaders in the use of outdoor and community laboratories for education to consider development of "total environments for education."

By 1968, the Conservation Foundation had withdrawn its support and the retirement of Clint Davis, Director of Information and Education for the Forest Service, meant the loss of the principal Forest Service supporter of the Institute. It was now just a matter of time until the new director accomplished the closing of the Institute on March 25, 1970. It is ironic that the following day, Dr. Brennan testified before the House Select Subcommittee on Education hearings on the proposed Environmental Education Act to urge federal support for environmental education.

Evaluation

It is always difficult to evaluate a program which ended before it could finish the ten-year program which was planned. On the basis of its short life, it was certainly a failure. Yet today, six years after its closing, and ten years after its program beginnings, it is possible to make a more positive evaluation, for many of the elements of the Institute design for "total education for the total environment" have been widely adopted, for example:

1. The conceptual approach to environmental education has been universally adopted, and the concepts, activities, and techniques developed in the Brandwein/Brennan textbooks and the curriculum guides have provided the basis for programs of environmental education throughout the world.

2. The concepts have been validated in the doctoral research of Robert Roth at the University of Wisconsin.[10]

3. Environmental education has been the major impetus to the development of interdisciplinary programs.

4. The National Council of State Garden Clubs, through their national conservation project, has distributed nearly 200,000 volumes of the curriculum guide, People and Their Environment, to the classroom teachers of the Nation.

5. Some of the most successful environmental education programs in the nation have been developed around the Institute philosophy and interdisciplinary approach, such as the program of the Lee County Florida Schools, and the "TETE" program in Wilton, Connecticut, which was one of the "model" programs established in cooperation with the Institute.

In short, ten years after the Institute program was started, it is safe to say that we did indeed have an impact on the development of curriculums for environmental education.

Perhaps the greatest contribution of the Institute was the bringing together of diverse peoples and diverse groups into a dialogue for the first time.

Finally, the Institute was able to assist in the development of some significant programs as a result of its staff activities, such as:

1. the original planning meeting on February 28, 1968 with the Swedish Ambassador to the United Nations which resulted in the UN Conference on the Human Environment at Stockholm in 1972, and assistance to the Secretariat in the development of case studies in education.[11]

2. development of the Advisory Committee to the Ad Hoc Congressional Committee on the Environment, 1968.

In terms of objectives, the Institute was successful. In terms of what it might have accomplished with the planned $2 million for the ten-year program, it was definitely a failure.

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MONROE COUNTY COMMUNITY SCHOOL CORPORATION RESIDENT OUTDOOR EDUCATION PROGRAM

by Donald J. Brown*

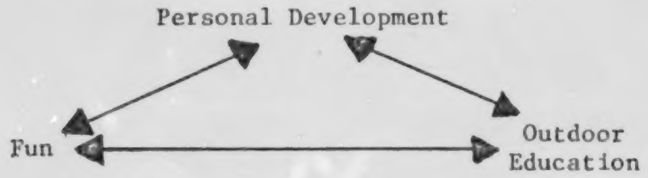
Using a residential outdoor experience as one aspect of a total environmental education program, Bradford Woods demonstrates one of the more sustained efforts in the country. Bradford Woods also represents that phenomenon of varied educational agencies coalescing in the interests of conservation. Originally a project of the Bloomington, Indiana, public schools, this program has come to involve all the schools in surrounding Monroe County as well as nearby Indiana University. This segment of the program is built around a five-day resident experience for fifth graders, under the tutelage of high school senior counselors, classroom teachers, elementary education majors, park and recreation majors, and resident naturalists. Per-pupil costs are relatively high, and no formal evaluations of the effectiveness have been conducted, but program faculty alumni and alumnae have gone on to assume positions of leadership in outdoor education around the country.

Part of the Monroe County Community School Corporation's elementary outdoor education and environmental study program is offered at the fifth grade resident camp level. Also involved is the professional preparation of recreation and education majors at Indiana University, with an emphasis in outdoor recreation and outdoor education.

The Monroe County Schools' program has evolved as a result of the complementary goals of the two organizations involved—Indiana University and the Monroe County Community School Corporation. Indiana University through its Department of Recreation and Park Administration and the Department of Education utilizes Bradford Woods (a 2300-acre outdoor recreation center owned and operated by Indiana University) as a learning laboratory for the preparation of leaders in outdoor education, recreation and camping. The arrangement of having the Bradford Woods staff coordinate the student teaching for selected elementary students and the professional field work students of the Department of Recreation and Park Administration, administer the on-site camp operation, and conduct post-camp evaluations has provided college students the opportunity of a first-hand experience in observation and, more importantly, in direct outdoor leadership.

Mr. Brown is Resident Camp Director at Bradford Woods, R.R. 6, Martinsville, Indiana 46151.

The program for college students consists of six weeks of study at Bradford Woods, preceded by three required core courses offered on campus at I.U., before the nine weeks of actual camp leadership begins. It is geared to provide college students with broad backgrounds of outdoor education operations and to be aware of and able to meet the objectives established for the outdoor education program for the Monroe County Community Schools. These objectives can perhaps best be symbolized by a triangle:



At one apex is the objective concerning personal development. The program encourages campers to develop physically, mentally and socially. The second apex includes the objective concerning education about the ecosystem. Principles of ecology are stressed and activities are constantly being reviewed as opportunities to understand and appreciate the delicate balance of man and the natural environment. The third apex involves the objective of providing the camper with a fun (adventure) experience. After all, the most evident reason why a camper comes to camp is to laugh, play with others, make new friends, have a good time and learn new ideas.

GENERAL OBJECTIVES

1. Self-realization

   a. to perceive man's role in conservation methods relative to plant and animal life

   b. to explore new avenues of individual creativity that are stimulated by the beauty and the setting of the outdoor environment

   c. to acquire skills in outdoor and environmental living in connection with satisfying experiences

   d. to use life situations in the outdoors for application of school subject matter material

   e. to provide for status needs and feeling of self-dependence.

2. Human relationships

   a. to provide a variety of social settings where students can be themselves and where group relationships and individual feelings are in proper balance

b. to utilize outdoor living quarters as a miniature community, where many community problems have their comparable aspects

c. to develop teamwork and group action through outdoor activities

d. to develop new friendships through outdoor experiences

e. to take advantage of the lessening of dependence on social and economic status and other barriers to real understanding due to the simple and informal manner of living and working in the outdoors

f. to take advantage of opportunities for teachers to establish genuine rapport with participating students afforded by the outdoor situation.

SCHOOL OBJECTIVES

1. To develop a sense of responsibility for the preservation and conservation of our natural resources.

2. To acquire the use of the power of observation and curiosity about natural phenomena as an avenue of learning.

PROGRAM OBJECTIVES

1. Knowledge

    a. to develop an understanding of natural resources
    b. to develop a greater understanding of the historical background of an area
    c. to realize that interrelationships exist between living organisms and their physical environment.

2. Skills

    a. to encourage the development of social skills
    b. to develop skills utilizing the students ability to see, hear, feel, smell, and taste
    c. to train teachers to utilize resources in the outdoors for an enhancing of both natural and social science instruction
    d. to manifest the cognitive processes of comprehension, analysis, and synthesis through stimulating and creative learning experiences.

3. Attitudes

    a. to develop an appreciation for natural resources
    b. to develop an appreciation for the historical background of an area, in our case the Bradford Woods area
    c. to stimulate greater interest in classroom activities which are related to real-life situations found in the local surroundings as well as in the Bradford Woods area
    d. to create a desire to develop healthy and physically strong bodies
    e. to promote a desire and a will to protect living and non-living resources important to man and to use them wisely.

4. Process

    a. to make outdoor or environmental education resources more accessible to all students
    b. to promote a desire and a will to protect living and non-living resources important to man and to use them wisely
    c. to realize that interrelationships exist between living organisms and their physical environment
    d. to strengthen the senses through close and accurate observation
    e. to promote the growth of a spirit of inquiry and the broadening of interests
    f. to manifest the cognitive processes of comprehension, analysis, and synthesis through stimulating and creative learning experiences
    g. to move the learning experience from an entirely artificial setting in the classroom to the real life environment
    h. to provide learning activities that cannot be structured in the classroom
    i. to provide learning activities which associate and connect learning and living and enable students to achieve better academic success.

CLASSROOM TEACHER OBJECTIVES

1. To gain increased awareness of the needs of individual children

2. To gain increased awareness of children's relationship to their classmates

3. To increase the teacher's own knowledge of the teacher-learning process

4. To increase the teacher's perception of the real values held by the students

5. To increase the teacher's ability to communicate with children.

HISTORY

The program at Bradford Woods for fifth grade children was initiated in the spring of 1957 under the superintendency of Dale Brock. Mrs. Lora L. Batchelor served as curriculum director and Frank Templeton as business manager. The original outdoor school was scheduled for two days and two nights for each of the Bloomington Metropolitan Schools. Approximately 50 percent of the fifth graders attended these first sessions.

The daytime school experience consisted mainly of nature study hikes. William Colpitts, a naturalist with the State Department of Conservation, was the educational consultant.

In 1958 the outdoor school was extended to three days and nights, with a similar program being used.

In the fall of 1959 the American Camping Association through its accreditation system approved a five-day resident outdoor education program for the Bloomington Metropolitan School District. This was the beinning of a planned curriculum correlation in the "classroom without walls." Library facilities, instructional media, films, bird recordings, and campcrafter materials were provided to help teachers adequately prepare the children for the outdoor experience. Thus, an enriched resident outdoor education program came into being.

In 1968 the Monroe County and Bloomington Metropolitan School Districts merged, forming the Monroe County Community School Corporation (MCCSC). This presented all fifth grade students in the Monroe County Community School Corporation with the opportunity to participate in the resident program at Bradford Woods.

During 1971 Indiana University and the Monroe County Community School Corporation grew even closer in their ties. College students doing field work in recreation were incorporated into outdoor leaders roles, university personnel were given administrative positions and a high school senior counselor program was developed. Also during 1971 Donald J. Brown was appointed as the first resident camp director for the program. Two years later, in 1973, Bernard L. Schrader became the first assistant camp director. In 1976 the program was changed from a fall-and-spring session to an all-spring camp, running for nine weeks.

TARGET AUDIENCES

Students

Every fifth grade student within the Monroe County Community School Corporation has the opportunity to attend camp for one week with his or her classmates. This includes approximately 950 students per year.

Cabin Counselors

Through the cooperation of guidance counselors at both Bloomington North and Bloomington South high schools, senior students interested in the outdoors and camp counseling are enlisted to act as cabin counselors. Permission of the student's parents and teachers must be obtained and classwork has to be completed before attending camp. Approximately 90 high school seniors are used in each nine-week program.

Teachers

All fifth grade teachers in the school system come to Bradford Woods with their classes. In some cases a substitute (usually a teacher from the same school who knows the students) will take the teacher's place if for some reason she or he cannot attend camp or the workshop session. Approximately 44 teachers attend each nine-week session.

Outdoor Leaders

Department of Recreation and Park Administration students in their junior year of college who are in the camping and outdoor education emphasis, have selected Bradford Woods as their field work assignment and have completed the necessary core courses on campus, are used as outdoor leaders. Also, Department of Education elementary student teachers may do half of their student teaching (eight weeks) at Bradford Woods and the other eight weeks in a classroom situation. Usually 14 outdoor leaders are used.

Student Teachers

Education majors assigned to a 5th grade class in MCCSC during their student teaching experience are welcome to attend camp with the class to which they are assigned. Approximately 25 student teachers attend.

FUNDING SOURCES AND HISTORY

Records of expenses and income during the early periods of the program were not broken down or pro-rated. An atmosphere existed that what was asked for was granted and the individuals in favor of the program may have been afraid to find out.

In 1971, when the program became a joint effort between I.U. and MCCSC, a big savings to the program occurred as the number of teachers required to attend camp was reduced from eighteen to four per week. Thus, the money spent for substitute teachers was greatly reduced. An administration charge of $6000 was paid to Bradford Woods for administering the program. In 1975 the cost to the students was raised from $20 to $25 and for the first time a positive balance existed at the end of camp.

In 1976 an even greater positive balance was created due to switching to an all-spring camp and the school system picking up the lodging expenses of the outdoor leaders and high school seniors. This may result in a decrease in the fee charged to parents if other rates do not increase.

No student is denied the camping experience due to an inability to pay the $25 fee. There are two funds, the School Assistance Fund and the Lora L. Batchelor Campership Fund, which provide partial or total assistance for those needing it. The School Assistance Fund is supported by the United Way and the Lora Batchelor Fund is a memorial fund established in 1972.

Cost to Parents

1957	two days and two nights	$ 3.50
1958	three days and three nights	5.00
1959	Monday thru Friday noon	8.00
1965	Monday thru Friday noon	8.50
1967	Monday thru Friday noon	10.00
1969	Monday thru Friday noon	12.50
1970	Monday thru Friday noon	15.00
1971	Monday thru Friday noon	17.50
1974	Monday thru Friday noon	20.00
1975	Monday thru Friday noon	25.00

OUTDOOR EDUCATION ACCOUNTING
1976

I. EXTRA CURRICULAR ACCOUNT

Income

Fees paid by parents	20,336.66	
Fees paid by MCCSC Assistance Fund	1,398.00	
Fees paid by Lora Batchelor Campership Fund	876.30	
		22,610.96

Expenses

Food Service	10,234.08	
Housing	6,111.25	
Insurance	504.50	
Materials and Supplies	236.04	
		17,085.87

II. MCCSC BUDGET COSTS

Bradford Woods Staff Support	10,000.00
Utilities	2,674.85
Transportation	1,974.25
Materials and Supplies	600.00
Total Board Funds	15,249.10

1976 PARTICIPANTS

Fifth Grade Students	930
Senior Counselors	79
Classroom Teachers	43
Student Teachers	25
Bradford Woods Staff	2

SUMMARY

Extra Curricular Expenses	$17,085.87	=	$18.37 per student
Number of Students	930		
Board Funds Expended	$15,249.10	=	$16.39 per student
Number of Students	930		
Total Costs	$32,334.97	=	$34.76 per student
Number of Students	930		

EVALUATION

There have been many changes in objectives, program content and administration during the twenty years of operation. The big change to a joint program with Indiana University in 1971 was a result of evaluations made by school administrators, teachers, University students doing field work and student teaching, Department of Recreation and Park Administration faculty and the Director of Bradford Woods. Since that change, the following evaluation areas have been established.

1. Outdoor Education Advisory Committee: Composed of three fifth grade teachers, three elementary principals, two Bradford Woods staff members, and the director of elementary education. It meets at least twice a year to evaluate and discuss the program, form policies, and make suggestions to the superintendent of schools.

2. Teacher-Training Workshop: Meets annually at Bradford Woods for all fifth grade teachers going to camp. Primary purpose of the workshop is for the teachers to meet the new outdoor leaders, go over rules, regulations. new ideas, what to continue, etc. All items are discussed and evaluated.

3. Classroom Visitations: Each fifth grade class is visited twice. The first visitation is usually three to four weeks before camp and then again on the Thursday before camp starts. During the first meeting, outdoor leaders meet with the students, while the teachers meet with a staff member from Bradford Woods to express their individual and classroom objectives for the camping experience.

4. Camp Evaluations: Each Friday morning during the camping session, the teachers and Bradford Woods staff meet to evaluate the week's experience. In the afternoon, the outdoor leaders meet with the Bradford Woods staff to cover the teacher's evaluations and their own reactions to the week's camping experience.

5. Students' Evaluation: During the week of camp, usually on Thursday or Friday, an informal written evaluation is obtained from the fifth graders concerning their likes and dislikes about camp, what they have learned, what they could teach a fourth grader, what they would do differently if they were the outdoor leader or senior counselor, etc.

In evaluating the program as to meeting stated objectives, I would rate it very high since activities and content have been designed to meet those objectives. Yet at the same time, activities are flexible enough to meet the needs and desires of individuals and different classrooms.

During the 1974-75 school year, the school system was going through a very difficult financial period. All types of activities and programs were being evaluated in order to reduce or eliminate expenses. During that time reduction or elimination of the resident outdoor camping experience was never suggested. This was due to a program that has had excellent evaluations through positive feedback of campers to parents and parents to the school system. Also, the cost to operate the program was not excessive. The program is also the longest consecutive running outdoor education program in the state of Indiana.

ASSOCIATED RESEARCH

Monroe County Community School Corporation Resident Outdoor Education Program Manual. A directorate dissertation by Bernard L. Schrader, November 1975.

WATERSHED HERITAGE PROJECT

by Joseph H. Chadbourne*

The Watershed Heritage Project is a classic example of environmental education with a hard core of ecological content married to a career-education orientation via integrated, applied-science learning units for secondary school students with a community-action concern. But the Project is more than that: it is the latest expression of a leader in environmental education and an enterpreneur without a peer at energizing financial support. Joe Chadbourne's awards and recognitions are as numerous as are the contributions to the literature he and his associates have made.

Purpose

The purpose of the Watershed Heritage Project is to prepare integrated, applied science learning units for secondary school students. The unit design is based upon (1) a selected teaching methodology and (2) sequenced subject matter. The units have been used as supplementary curricula, a full environmental studies course, independent study, and as advanced work and/or career-orientation materials for gifted students.

The Project's educational goal is to heighten student interest and achievement in learning independently. The environmental goal is to equip students specifically to qualify for jobs and generally to handle future environmental problems.

The educational methodology is a systematic process for relating students to activities. The "system" includes participants in specialized tasks followed in sequence and governed by rules, schedules, and physical locale; materials and equipment; methods of measuring and evaluating; and criteria for drawing conclusions. The students actively plan and carry out duties; by such total participation they gradually take responsibility for the environmental work done.

The environmental subject is watershed management. Starting with basic, standard, analytical water-quality control procedures, students begin a thorough, scientific, baseline investigation of their watershed. Inductively they assemble the facts about their unique community. Problems identified are referred to the associated responsible agencies. Students then begin a working program to help understand and solve the problems.

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Need for the Project

From the beginning, the educational methodology and the environmental subject matter evolved concurrently. The perceived educational need was to allow students to collect original data, draw conclusions, and form their own hypotheses—i.e., apply the scientific approach to real problems. Teachers stated that a 12th grade research course would provide a suitable structure. The subject matter, however, was an option of the students. From a variety of alternatives, they chose local water pollution problems. The two ideas fused. One year later, the Federal Water Pollution Control Administration foresaw a need for interesting qualified students in the career field of "sanitary engineering." Therefore, FWPCA (later incorporated into EPA) identified the early efforts as a career training program. Later, in 1971, the U.S. Office of Environmental Education grant reviewers independently concluded that a program like that of the Project's student investigators could meet the goals of P.L. 91-516. Inexorably, EPA's Water Pollution Control Act (P.L. 92-500) and the Safe-Drinking Water Act (P.L. 93-523) called for citizens to learn about these environmental-quality regulatory procedures and to aid in their enforcement. To this end, the EPA foresaw that young people, knowledgeable and experienced in studying environmental problems, were solid future investments.

The Project continues to expand as land preservation agencies, parks and recreation areas, and schools' special programs coordinators recognize the benefits of combining education and community service projects of this type.

Objectives

The goal is to encourage adoption and then implementation of this Project in formal school settings. The steps toward that goal include:

1. To initiate trial adoptions of the Project throughout the United States; to compare implementation strategies; to describe the most effective of strategies as an idealized, replicable model;

2. To establish several national training centers with universities, neighboring school systems, and appropriate local environmental agencies;

3. To deliver through centers a training "package" for teacher training; to provide inservice support for teachers; to individualize materials for students; and to provide low-cost, accurate equipment and unitized supply kits.

Project Management

The embryonic student Project appeared during the summer of 1967. While located at University School, Cleveland, Ohio and at Tilton School, Tilton, New Hampshire, the principals began teacher-training. In 1971 they formed the non-profit, public service Institute for Environmental Education as a research, planning, training, and curriculum-development organization. The Institute helps initiate trial adoptions, turning over subsequent management to the trial site participants. A university, science museum, school district, special education services center, or a park and recreation area may serve as headquarters for coordinating the local sites and the Institute's programs.

The Future

At National Training Centers (for summer 1977 these include Yellowstone National Park, Montana; Pittsburgh, Pennsylvania; Fairfield, Connecticut; Cleveland, Ohio; Portland, Oregon) the Institute will provide training in Phase I Learning Units (water quality analysis) and introduction to Phase II Learning Units (soils, plants, animals, and environmental impact inventory systems).

The Institute provides sequential training sessions, printed and audiovisual instructional materials, special equipment, and supplies, with schedules for these announced through its newsletters and workshops.

Special curricula on independent studies for gifted students and programs for careers in environmental sciences will be prepared under contract and grant programs.

Funding Sources and History

Since 1967 the funding sources typically have been 50/50 match grants from federal agencies and private foundations. Funds were used for staff salaries, grants to participating schools, purchase of equipment and supplies, operation of summer courses, and operating expenses of in-service coordination and instruction. The essential grants are listed as follows:

Year	Granting Source	Amount
1967	Cleveland Foundation	$14,000
1968	Cleveland Foundation	17,000
	Gund Foundation	5,000
1969	Ford Foundation	85,000
1970	Federal Water Pollution Control Administration, Department of Interior	75,000
1971	National Science Foundation	13,000
	Environmental Protection Agency	49,000
	Office of Environmental Education (HEW)	35,000
1972	Office of Environmental Education (HEW)	80,000
	Cleveland-Gund-Jennings Foundations	80,000

Year	Granting Source	Amount
1973	Office of Environmental Education (HEW)	64,000
	Gund Foundation	15,000
	Member Fees	11,000
1974	Environmental Protection Agency	76,829
	Office of Environmental Education (HEW)	25,000
	Kent Smith Foundation	10,000
	Schubert Foundation	10,000
	Ohio EPA	6,000
1975	Environmental Protection Agency	65,000
	Gund Foundation	12,000
	American Revolution Bicentennial	10,000
	Mogul Corporation	3,500
	Cleveland Foundation	8,000
1976	Environmental Protection Agency	21,000
	Mogul Corporation	3,500
	Cleveland Foundation	10,000
	The Nature Conservancy	60,000

The list does not include monies paid by trainees and participating schools for in-school program operations.

Sources typically favor either the educational goals or the environmental goals, and therefore may have supported the pilot and developmental work piecemeal, rather than as a total program. For example, the Mogul Corporation awarded a four-year $3,500 grant to the Institute for a graduate student coordinator at The Ohio State University, but no funds accrue to the Institute in this case. A substantial amount of 1969-74 grants were direct sub-grants or a matching requirement to school systems to train teachers and to equip classrooms.

The number of teachers trained, their students instructed, and the numbers of successive years of participation is frankly not well-known. In addition to hundreds of teachers and thousands of students implementing the Project's curriculum, thousands of books and audio-visuals have been distributed since the first publications in 1969.

The funds collectively allowed the Project to expand, encompassing greater numbers of students and larger areas of the country:

a. 1967-68 -- summer courses for students
b. 1969-71 -- summer training of teachers
c. 1972-73 -- piloting of year-round regional center
d. 1974-75 -- expansion to a five-region state-wide experiment
e. 1976-77 -- expansion to a five-state national program

Future funding will strengthen the five National Training Centers and add sequences to instructional modules, rather than increase the number of centers.

Target Audience

Age.--Project materials have been used by 4th grade through graduate school students. As in typewriting, no prior experience is required to learn project skills and age has little bearing. Unlike typewriting, however, there are higher cognitive levels of learning to which the project's subject matter can be taken; i.e., comprehension, application, analysis, synthesis, and evaluation. Success is a function of the teacher's preparation and the students' abilities. The expected target population, however, is 7th-12th grades, with the initial activities starting at the 7th and progressing throughout the six-year period.

Ability.--Normal grade-level reading and mathematical skills as well as enthusiasm are the essential requirements. Some students in each group must have sufficiently adaptable psychomotor skills to wade in streams, collect water samples, and perform general laboratory tasks. Some students must be licensed drivers on projects requiring automobile travel.

Schedule.--At least one three-hour period each week for field work is a minimum requirement. Students may need additional laboratory time to complete their analyses.

Space.--Fixed experiments require 15-20 square feet of surface with equal space for storing supplies. Wall space for graphs and charts, carrels for audio-visuals, and access to a computer terminal and reference materials are all highly desirable.

Organization.--The project activities are most appropriate for 2-8 person independent study groups or rotating subgroups of a larger class; a medium-sized group of advanced science students. Activities include supplementary units of regular biology, chemistry, earth science, or interdisciplinary science courses; career-education programs; applied research; and individualized studies for the gifted students.

Location.--Several teachers from a single school, and several schools from a shared watershed are ideal. Minimally hazardous stream locations, legal clearance to use them and access during school hours are all imperative.

Project History

These introductory remarks serve as background to the Project. They are my interpretation of events from 1967 to 1974 which give definition to the "Ohio Watershed Heritage Project." Statements are sometimes made in the first person to emphasize the essential subjectivity of the narrative.

The Ohio Project began at University School in Shaker Heights, Ohio in the spring of 1967. Jonathan Ingersoll, newly appointed Director of the 1967 Summer School, hovered at my biology lab door, judging the best moment to issue his first directive. He did not know that I, too, was poised toward a new direction: My colleagues and I were disconsolate from teaching out of graduate notes and our students were restive because they wanted to get their hands on real problems. The moment was right—and Jack Ingersoll was a courageous and patient man.

For the next two years the Summer School was devoted totally to a single program—a firsthand investigation of the natural and human forces that created the current environmental status of the Cleveland metropolitan region. We worked together, teachers and students, throughout a thirty-mile radius of University School. We used familiar scientific approaches to study the Cuyahoga River basin's geology, soils, hydrology, plants, and animals. And we examined some of the social systems and political decisions accounting for housing developments, land improvement, mining operations, and recreation areas. The investigators examined rocks, sifted dirt, captured insects, weighed vegetation, tested water, constructed maps, photographed, interviewed, argued—and cooked out together.

Jack Ingersoll and Headmaster Rowland McKinley applied to the Cleveland and Gund Foundations to fund experimental work. The Cleveland Public Schools and surrounding suburban schools recommended eighty students, each of whom Jack interviewed personally. We still hear from them and know that many are now committed to environmental avocations or even vocations—possibly influenced by the summer programs.

One student, Bill Schlesinger, was a student instructor during the first summer. He joined five others that first fall, 1967, in a sequel plan that we disconsolates had invented during the tenure of Science Department Chairman Jack Baker: a 12th grade Applied Science Course. Bill's enthusiasm and skills convinced the other five that the Applied Science Course should focus on water pollution. We teachers teamed as an advisory body and assigned the first test, due before Christmas: to design a water laboratory, to research standard analytical techniques, and to plan a field program for the remainder of the year. The six students contacted The Three Rivers Watershed District (a regional water resources planning agency), learned techniques required by the U.S. Public Health Service "Standard Methods," built a laboratory inside a maintenance room, and established water quality study schedules in which the students provided The Three Rivers Watershed District regular data on the Chagrin River. From this small but auspicious beginning grew the "Ohio Watershed Heritage Project," problem-centered and student-operated.

During this first year of the senior Applied Science Course, nearby Laurel School's Dr. Irene Hall invited her cousin, Robert Snider, to visit her and appraise the course. Mr. Robert Snider, then Director of the Office of Training Grants, Federal Water Pollution Control Administration, Department of the Interior, became our grants officer. Snider was surprised by the students' knowledge of "sanitary engineering" and by the results they had achieved. In 1968 there was a critical manpower shortage in sanitary engineering attributable, Bob speculated, to lack of secondary school training in that career field. He seized on the idea that a course such as this would challenge students to enter the profession. If we could learn how to introduce such courses into other schools, he concluded, a long-range plan would be of great interest to his Office of Training Grants.

But we despaired of tackling a task of that magnitude, turning more confidently to preparations for the Summer of 1968. Again, however, coincidence altered our plans. Nearby John Carroll University's science department chairman telephoned to ask if two teacher-interns could enroll in our summer course for the field experiences. Immediately two more teachers requested participation, and before we could say "no," our first four-man teacher trainee group arrived for the summer.

During that second training session the effectiveness of mixing teachers and students and treating them as colleagues was so pronounced that we have, ever since, insisted on a 50/50 distribution of teachers and students in all training situations—both as trainers and trainees.

Realization of Bob Snider's hopes for a national training program moved palpably closer. Peter Mott chaired the Science Section of the National Association of Independent School's Annual Conference that year. Having learned about the University School's water studies course, he asked University School to demonstrate a mini-version of the course in New York City. In mid-March, 1969, University's 12th graders trained Collegiate School's 10th graders. In turn, the 10th graders taught a miscellany of NAIS member teachers—again using field problems in Central Park and the Hudson and East Rivers. At the end of the first two days, Cleveland's Three Rivers Watershed District Director, George Watkins, flew to New York City and testified before the teachers to the accuracy and value of the students' data. The workshop teachers promptly requested a summer training workshop for themselves.

Ford Foundation observers Bill Felling and Ned Ames invited us to submit a teacher-training proposal. A year after Bob Snider's proposition, we reported that now we might be able to test-duplicate the University School course. In 1969-70 and 1970-71 FWPCA matched a Ford Foundation grant, enabling us to prepare teachers and students, develop instructional materials, and attempt implementation of the course in 20 other schools in a dozen states. Headquarters were at Tilton School, Tilton, New Hampshire where I unaccountably became headmaster. These developments preceded formation of the full-time Institute for Environmental Education in Cleveland.

Throughout the two-year period, extensive interaction and communications took place among the participants. Interpersonal contact took many forms: two successive residential summer training sessions at Tilton; visits by a full-time, itinerant interscholastic coordinator; mid-year reunions; and frequent telephone conversations.

In spite of this the Tilton teacher/student trainees reported from their schools that implementation was difficult. In 1969 and 1970 their fellow faculty members looked at them askance, not understanding what "environmental studies" meant. They voiced their misgivings by objecting to the apparent disorganization accompanying field studies, the lengthy periods that students were away from school—often conflicting with other schedules, including athletics. Moreover, they resented the enthusiasm students showed for the work. These teachers seemed threatened; indeed, they often showed open hostility. At the least they were often unaccommodating. As a result, most of our trainees could not arrange the 2-4 hour field period to which they had grown accustomed during Tilton's summer sessions. The trainees' departments were jealous of the agreement between the grant administrators and the participating school principals that required expenditure of school monies to match those provided by Tilton from the Ford Foundation and FWPCA grants. Opposition took its toll: back at school our trainees lacked the reinforcement of interest, knowledge, enthusiasm, and single-minded dedication so abundant in the summer training program. Altogether these difficulties guided a remodeling of the Tilton program, leading to the Cuyahoga River Watershed Project, and later the Ohio Watershed Heritage Project.

After two years the Tilton trainees recommended that in the future we should:

- require 2-5 teacher/student teams from each school to attend any training workshop;
- select schools geographically close enough to one another to form a "cluster," thereby fostering frequent trainee-interaction;
- following the training, systematize regional meetings by time, place, and agenda;
- provide an in-service coordinator to: continue in-service supporting instruction, publicize the program, process the data, and generally provide continuous assistance.

We accepted their recommendations as criteria for redesign.

For the very next training session in 1971 we selected three regions containing trainees from the preceding years: Quincy, Massachusetts; Philadelphia, Pennsylvania; and Cleveland, Ohio. The National Science Foundation provided funds for workshops at the first two locations, and the Office of Environmental Education and the U.S. Environmental Protection Agency for the third cluster. Each of the clusters had a different future.

Despite our efforts, the Quincy cluster collapsed. After the summer training we could not secure the money to establish an in-service coordinator. The ten area schools lacked leadership, presumably because no school was prepared to give teachers release time, travel expenses, or special allowance to serve the other schools. In contrast, the Philadelphia cluster flourishes today. After the summer workshops, the two Tilton-trainee workshop leaders, Alan Sexton and Jack Hershey, were hired by Project KARE, a new five-county Title III Environmental Service Organization of the Office of Education. Al and Jack were able to incorporate the cluster under the Project KARE umbrella. The cluster, in turn, helped shape the KARE program. KARE still operates, and in 1975-76 shared its experiences nationally via the Office of Education's Title III Diffusion Network. (See "Project KARE" case study, pp. 112 ff., of this volume).

In Cleveland in May 1971, we formed the non-profit Ohio corporation, the Institute for Environmental Education. By the following year we officially had started a three-year regional cluster, the "Cuyahoga River Watershed Heritage Project." We hired Dr. Peter Gail to coordinate the project full-time. He accepted an adjunct assistant professorship at Cleveland State University, and organized a series of courses at CSU over the three-year period. He employed an assistant and several trained student interns to furnish in-service support to the growing membership. General Motors and Ford Motor Companies gave the Project two 12-passenger vans; the Office of Environmental Education and the U.S. EPA granted matching funds to the first member schools to adequately supply them with equipment and instructional materials. The Cuyahoga River Watershed Project expanded rapidly over the three years from 9, to 17, to 30 participating schools. At a late 1975 weekend workshop, some 132 teachers attended. The three-years' experiences provided background information for designing the five-cluster Ohio Watershed Heritage Project.

The Cuyahoga Project is now self-supporting. Dr. Gail has joined the Cleveland State University full-time, and the training courses are presently being considered as requirements for a new master's degree program. Our findings, teachers' assessments, and students' activities developed after Tilton are described in The Environmental Education Guide Series available from the Institute (see note at end of this report).

By late 1974 conditions were ideal for another expansion. The Congressionally-approved Environmental Education Act (P.L. 91-516) and the Federal Water Quality Amendments Act (P.L. 92-500) both called for environmental improvement, public education, and citizen involvement. The U.S. Environmental Protection Agency asked if trained teachers could contribute to the monitoring requirements of P.L. 92-500. The five-region "Ohio Watershed Heritage Project" was formed to seek an answer.

With the Ohio Environmental Protection Agency, the U.S. EPA and the Institute began a model of the Cuyahoga River Watershed Heritage Project in four additional areas: Columbus, Bowling Green, Athens, and Dayton, Ohio. The objectives, teaching methodology, training program, plans for perpetuating each program, and overall results of each are described in this report.

Simultaneously, the U.S. EPA and the Institute and the Oregon Museum of Science and Industry started a model in Portland, Oregon. Now in its second year, the OMSI model and Ohio regional models will be independent of EPA funding next year. The test of self-sufficiency remains at the time of this writing.

Regardless of that outcome, a regional Center began at Fairfield University in Fairfield, Connecticut during the summer of 1976; another is planned in Pittsburgh, Pennsylvania in 1977. Thereafter, energies will be directed to reinforcing Center staff, course offerings, materials and to diversifying from learning units on water quality analysis to inventories and management of land use. Programs for students with special interests will be modeled on those of the basic Watershed Heritage Project.

Evaluation

An instrument for evaluation was designed for comparing how the areas implemented the Project and what planned and unplanned results occurred. Data were collected differentially: by region, by school, and by information source. The instrument, a questionnaire, proved a reliable measure of achievement and harvested a diversity of useful value judgments. That data suggested modifications in the second year's summer training, organizational relationships among the three principal groups, and essential content for student activities.

The questionnaire sought reactions from some or all participants and observers on ten different subjects (see Table I). Some questions required "yes" or "no" answers; others, explanations. The questions were formulated by Janet Beck, a Case-Western Reserve University Law School student, and field tested by Greg Cznadel, an undergraduate project intern from Kalamazoo College. The five graduate student sources were interviewed in person on tape; the other sources responded in writing. We gathered these responses during May and June, 1975, nearly a full school year after initiation of the project.

A second questionnaire was answered by students attending a teacher/student feedback session April 11-12, 1975. At that time five questions provided by the U.S. Environmental Protection Agency were given to forty-five students:

1. Is the Project challenging to you? Why?
2. How do you feel about it personally?
3. What have you learned?
4. What is your future in the Project?
5. What would make the Project better?

Responses were listed by region and school, and then copied and distributed to each of the five Regional Coordinators for teacher information. Additional copies were sent to U.S. EPA and Ohio EPA. They are presently available from IEE.

Other information for evaluation came from non-formal means. Monthly regional meetings, telephone conversations, letters, school site visits —all allowed us to ask questions of teachers and students, observe field sampling procedures, and examine equipment and reports on a personal level.

TABLE I

EVALUATION PROCEDURES

	Information Category	Source Category				
		Graduate Students	Teachers	Students	Parents	Observers
I	Before the Project	X	X	X	-	-
II	Changes subsequently	X	X	X	-	X
III	Program definition and features	X	X	X	-	-
IV	Benefits to students	X	-	X	X	X
V	Multiple discipline approaches	X	X	-	-	-
VI	Relevance of topic	X	X	X	-	-
VII	Outside perception of the program	X	-	X	-	-
VIII	Ways of evaluating the program	-	X	X	-	-
IX	Career and educational plans	-	X	X	X	-
X	Self learning and comments	-	X	X	-	-
	Numbers of sources responding	5	28	109	30	20

Collectively, formal and non-formal responses provided the information for this report. The respondents presented this overall picture:

Regions: four out of five successfully implemented the Project.

Graduate Student Coordinators: popular, respected, effectively employed in small regions, relegated to delivery status in large region.

Teachers: elated with student achievement, administration of the program, and parents' support; frustrated by equipment shortage, inadequate supplies, and field logistics.

Students: challenged by national environmental priority, enriched by research experience, pleased with teacher/student equity; bored when limited to test repetition; disappointed when EPA was not involved; begged for expanded activities.

Parents: gratified by school's adoption, recognized career implication; accepted risks; reported heightened interest in learning; helped with transportation.

Observers: emphasized practical value, lauded students' awareness of environmental problems; recognized opportunity for independent learning and for community improvement.

At a later stage the Project should be evaluated professionally by an outside organization. Plans have been formed with Case-Western Reserve University to research an evaluation procedure and to conduct the study. The evaluation will determine specifically why schools first "adopt" the Project, and then how teachers and students "implement" the Project. It will include verification of student performance on examinations, and will itemize recommendations for Project improvement. Overall, its purpose will be to guide teachers to use investigative processes wisely, so they may carry on vigorous, effective programs in environmental studies.

Graduate Students

As information sources, Graduate Student Coordinators are uniquely qualified to report regional Project activity. The coordinators were the only persons who visited all schools and the participants on a regular basis and were thus able to observe the changes throughout the year and contrast changes within and between schools. In 1975 University faculty chose them for their motivation and ability. The coordinators were paid through grants from the Institute for Environmental Education. Their task was to communicate regularly and incisively with all participating regional teachers and students throughout the school year. The Institute found their integrity and honesty unassailable.

Not all coordinators, however, had equal access to information. One covered three schools, another thirteen. Some became intimate associates with the teachers and students, a few were seen as teachers' assistants and given field responsibilities by these teachers, while others had time only to transport equipment or supplies, one starting in mid-year, and each had different teacher needs to manage. Therefore, opportunities for gleaning information depended on several factors, as stated by one of the five graduate students:

> In terms of what I do, if the Graduate Student weren't there, the program wouldn't be in existence...to tie in all the high schools. It's really hard for the high schools to get out on their own and make it meaningful. I think someone should be there coordinating the effort. In our case we have high schools 25-30 miles apart and they are working together pretty well. My role is to tie in all their work and make it seem like they're working as a whole instead of just little pieces. The main thing...you know people oftentimes, when they are working, thinking about the environment, consider themselves powerless and maybe even a school can get that same idea. They think, 'Well, if I do something it's not going to mean anything. If my school does something, it's not going to mean anything.' I think the Graduate Student can tie all the schools together and the Graduate Students' role is very important since there are schools in various parts of the state.
>
> We are Graduate Students in Columbus, and Dayton, and Athens and we are all working toward the same thing and don't have the feeling that our work doesn't count. It does count and you can see it. And I think the students can tell. I can tell it and if I can keep the students aware then it will be a lot better when someone's out testing Po Ditch every other Thursday. They test it and they get a little bit out of it but this way there's a whole they're working towards. I think that's one of the things that should really be brought out. My role is to keep that whole going.
>
> In Columbus there are 13 schools, here there are only four. That makes it easier for me; I can spend a lot of time with them and get out into the field. They ask me questions and I try to answer them as best I can. They need resources and I try to lead them to resources.

Teachers

Thirty secondary-school teachers with one or two students each from schools in Athens (5), in Bowling Green (5), in Columbus (13), and in Dayton (5) tried to implement the "Watershed Heritage Project" in 1974-75.

These men and women from public and parochial schools who taught 7th-12th grades and two years of technical college had previously incorporated some environmental studies into their life science, general science, earth science, biology, geology, chemistry, ecology, and environmental science courses. The majority reported 1-3 years of environmental teaching experience, the others from 0-10 years.

Following the two-week summer orientation to Project methodology and skills, each planned different ways to combine watershed investigations with other teaching assignments. Some adapted ideas from the Cleveland regional school teachers who had been their summer instructors: Nancy Glass from St. Edwards High School, Jack Arnold at Berkshire, and Ron McEachen from Woodridge. These three taught environmental studies either as a complete, year-long course or as an independent study elective. A few considered the Project study extracurricular. Others simply used Project activities to supplement established courses. The 28 teacher-trainees later made these statements about their individual implementation plans:

- I am planning to include some aspects of the program in the earth materials of my Earth Science course, in the ecology section of my General Science course and in my assigned area of our Science Research course.

- I use it when teaching an ecology unit in General Biology and in General Science.

- It helps out a great deal in my part of the Environmental Unit dealing with water pollution.

- In chemistry—deal with water quality analyses, fits well into curriculum.

- This study has been saved for more favorable spring weather conditions for outdoor study and for a review and culmination of previous learning experiences in the areas of topographic mapping, latitude and longitude, geology and meteorology.

- The overall science plan includes the study of pollution and how it affects our lives. The water quality study fits the program very well because we strive to get the students out of the building and into their community environment.

That the Project is student-centered may explain such differences among plans. Not surprisingly, when asked how this Project differed from others, the teachers recognized that emphasis: there was "much more student independence and responsibility"; the "student sets goals, establishes procedures, investigates real problems"; the Project was not "textbook oriented, students actually performing meaningful activities and tests"; and that its applicability differed by "age level, mobility, size and student interest level."

Most teachers were undaunted by the Project's changing their traditional roles. Long-range gains were more important than immediate losses. They were most impressed by student achievement, and the enjoyment of working with students as colleagues. The statements below suggest the depth of satisfaction felt during the year.

- I like working with students on a more personal basis. I also find personal satisfaction in actively contributing to the environmental effort.

- Working in the close situation, and during adverse weather conditions, presents the opportunity for a teacher/student relationship to develop that wouldn't be possible in the classroom.

- I find that the 'teacher'/student feelings weaken and the feelings of 'co-worker' develop.

- Working with students in the field without textbook gives one a good insight as to what is important in the learning process and one's approach to evaluation.

- At the onset of this Project I really felt that keeping a group of students enthused and cooperating was almost too difficult. However, in our seemingly darkest moments several students carried the torch. The present students have a remarkable relationship.

- I enjoy working with the students outside and am able to reciprocate their enthusiasm more readily.

- I am capable of treating students as equals and students are capable of shouldering more responsibility than I sometimes give them credit for.

- I enjoy teaching more when the student is enjoying learning.

These statements do not reflect that the program was physically quite demanding. Only one teacher broached the burden directly, stating, "I was already doing all the activities which I am physically capable of doing. This program hurts the quality of my teaching in classes." Realistically, much physical exertion is needed from all participants, if the program is to fully generate the results described. Reinforcement for that effort comes from frequent interaction with other teachers, the Graduate Student Coordinator, and members of the environmental agency.

(In the Athens Region, that external support system collapsed. Nonetheless, a few teachers, especially at Logan and Hocking Technical College, doggedly tested water throughout the year, but neither school permanently incorporated the Project in the second year.)

The teachers rated the program by looking at changes in students' attitudes and by comparing the students' original goals with actual achievement. Interviews, written examinations, and laboratory work provided the data. Some perceived greater self-reliance and initiative in students and ranked these gains positively. Certain words recurred in the ratings; "interest," "achievement," and "enthusiasm" were mentioned as often as quantitative gains. In the end teachers made these recommendations to increase the Project's effectiveness:

To the Institute:

1. locate stream test sites nearer schools;
2. locate more, better, and less expensive equipment;
3. increase availability of pre-measured supplies;
4. add new test parameters;
5. put more emphasis on data interpretation;
6. keep administrators informed;
7. organize into independent study modules.

To the Schools:

1. involve more students;
2. schedule longer blocks of school time;
3. secure regular transportation;
4. assign reserved classroom space for Project work;
5. establish a two-year program sequence;
6. change from extracurricular to entirely curricular program.

The Institute considered and acted upon the first seven. The 1975 summer and in-service year training are organized to achieve these new goals. Completion of the independent study modules will help the schools gain recognition of the Project as a legitimate course. Once recognized, the first four recommendations to the schools should easily be met.

Students

Sixty-four students responding to questionnaires were overwhelmingly affirmative, urging that the program be expanded to include more students, more equipment, additional water testing techniques and data interpretation, and—emphatically—continued involvement of the Ohio EPA. They most urgently wanted to continue the purposeful labors and the new-found relationships with fellow students and teachers.

The longer they participated, the more students discovered values which they had not anticipated, values important to Project expansion. An analysis of 50 written questionnaires reveals this ranking of reasons for originally electing the Project:

38% - environment or environmental problems specifically mentioned
30% - interesting, fun, intriguing, challenging, worthwhile
10% - "I love the out-of-doors, nature, the woods, walking up streams"
6% - science teacher's recommendation
2% - job implications
2% - self-learning
2% - something to do during the summer.

After several months' involvement, students recognized two new groups of reasons why they liked the Project, reordering the original reasons slightly and placing the new groups in first and second place:

1. freedom, responsibility, relevance, first-hand experience;
2. people-to-people orientation;
3. environmental content;
4. applied science;
5. advance preparation for later courses and careers;
6. knowledge for self-improvement;
7. getting outdoors.

Throughout all forms of communication, the students expressed surprise at and delight with (1) the recognition given to their usefulness and (2) the high regard from their colleagues.

They said:

> Students were deeply surprised by the discovery that teachers did not fit the stereotype. Very close, personal bonds developed between students and students and teachers. Both remarked frequently about this phenomenon, e.g.:
>
> - This type of course is a first for me. I really like it. Mrs. Glass has removed the pressure but not the desire for learning. It has become less mechanical and more natural. She has a way of teaching so that what you learn becomes a useful part of your life; not just 40 minutes a day out of your life like some classes have been.
>
> - This course was the most interesting I have ever had and I hope they keep it in the high schools for a long time. All you need is student interest and a motivation and it should be a great course. You also need a teacher like the one we have at Whitmer who always helps anybody with questions.
>
> - You really get to know teachers as people.
>
> - When I first started, I didn't realize that teachers are people. But now when I see a teacher, I think about the person. In this way I am glad I took the course.

They also identified that Project skills were applicable in biology and chemistry and anticipated that work habits would be advantageous for college-level studies.

> - (A 7th grader) It's a good way to learn chemistry before you're in high school.
>
> - My lab skills are more advanced than others in my class.
>
> - I'm probably more adequate in the lab and have developed more proficient methods of chemical testing.

- I know a great deal more about lab equipment and chemistry.

- I think there is a lot of biology and chemistry to be picked up at these workshops. My biology class in school is really easy this year.

- Prepares for college due to the fact that one works on his own and is not pressured.

Above the immediate cognitive learning, students apparently synthesized connections with other locations, people, and events. Their perspective was stated in words such as these:

- I've learned that a project like improving water quality would take a long time and a great deal of work. Just gathering data and determining quality at the present time takes an extreme amount of work and time. I've learned that there are many elements involved in water quality and that there are many variables that will change that quality.

- I've learned how to test for D.O., test for pH, fecal strep, flow, bottom samples; we've put hester-dendys in our rivers, all this plus more in the science field. You also learn about people. People from all over the state, their problems with their communities and, basically, that we're all alike, even though we have different ideas and come from different parts of the state.

- I have learned, of course, how to take flow, D.O., total coliform and pH. I have also picked up five easy steps to falling into water. Also, you become aware of your father's 25-years-in-the-power-industry gut reaction to the EPA. What we're up against is stifling. He will admit things are bad but what can you do about it, stop running all the industries? Where is the money to clean up going to come from? Probably the biggest advantage of this program is getting a head start on thinking about what to do.

Such opinions from students suggest areas to cover in any evaluation of projects. Reports showed that one-half received grades based on written examination, the other on field and laboratory performance. Most felt they should be judged on the basis of (1) their interest level, (2) contribution to group tasks, (3) ability to perform analyses, (4) techniques in using equipment, and (5) success in teaching others how to perform the same investigation.

The only controlled study comparing instructional methodologies was made at St. Edward's School. Three teachers used different methods on academically high, middle, and low-average student groups. With the method described in this Project, the low-average students had a higher mean score on a standardized test than more able students taught by the lecture-lab approach. The teachers made this report (graphed data not included here):

The students participating in the study were freshmen at St. Edward High School in Lakewood, Ohio. They were in Earth Science classes taught by three teachers: Brother David Fitzgerald, David Holian and Nancy Glass. The subject matter was the same for all three classes.

Brother Fitzgerald had the honors sections and the two high average classes. He taught by lecture, slide, overhead and structured labs.

David Holian had the middle average. He began the year with lecture and structured lab but slowly converted to open labs and student involvement in planning of labs and classroom structure.

Nancy Glass had the low-average and low achievers. She used student-involved planning and process education methods exclusively.

In June all students were given the same standardized test with the following results:

Class	No. Students	Mode	Mean	Range
Brother Fitzgerald	63	39	27.19	30
David Holian	131	33	32.76	42
Nancy Glass	125	27	34.39	40

The students, like their teachers, submitted recommendations:

1. Improve the organization of time, assignments, transportation, working space, and availability of equipment.
2. Specify additional test parameters and instructions for those procedures.
3. Provide more instructional units on data interpretation; increase number of Graduate Students and experienced high school students.
4. Train more than one teacher/student team in a single school; include more students in the testing routine.
5. Require that all Project activities be conducted during the school day and that they become part of an accredited course.
6. Establish a regular summer training program (one week) for new teachers and students.

The Institute has responded to these recommendations by (1) preparing a "Watershed Heritage Project" brochure describing the long-term, three-phase Project plan; (2) printing five additional single-page flyers listing the instructional materials, equipment, and supplies for each of the Phase I Learning Units; and (3) establishing five summer training sites (Connecticut, Pennsylvania, Wisconsin, Montana, and Oregon) to increase the number of teachers and students trained and to add more kinds of investigations.

Parents

The replies from parents were not satisfactory in depth or precision, probably because the method of administration was extremely selective and because its reliability depended upon the follow-through of interested teachers, the accompanying explanation, and the interest of the parents. No doubt a good many of the statements of criticism were not returned or were simply omitted; thus, the preponderance of favorable remarks.

In their closing, voluntary remarks, however, they summarized the collective reasons why all of the parents favored the Project:

- Sylvia's teacher, Mrs. Rea, has been the chief reason that the whole experience has been so positive for Sylvia. She's quite a teacher!

- I'm grateful my son has had an opportunity to be involved in the program.

- This activity fit in well with her past interest. Field work is very important to give students a chance to translate book knowledge into action.

- This program tends to make these young people more responsive to the need to work for society.

- She has enjoyed this opportunity and is quite willing to work at the project.

- We are very proud of our daughter for taking an active interest and following through with this project. We also are very happy that she has a teacher that is interested in the students and the extra time he gives for their benefit. This experience, during the year, and the opportunity to work with Ohio State University and teachers and other students has helped and will help her in the future. A great growing experience.

- I am surprised that there weren't as many involved in the project—maybe next fall there will be more signing up. I would be very disappointed if the project was cancelled due to lack of interest.

The parents' commitment to the Project is proved in their trust of its overall integrity. They showed that trust by listening sincerely to student discussions, helping with after-school field work, granting permission for open-ended field explorations, and encouraging the students to assist public service organizations that demand responsible behavior and accurate research.

With such support, students have adjusted rapidly to heavy responsibility. They have written, successfully applied for, and directed federally funded programs. Several earned appointments to watershed commissions and municipal boards. Numerous student trainees have traveled throughout the country as Institute staff to train others. In addition to the many public presentations, students have testified before many states' Attorneys General and several times before the U.S. Congress. While much of this occurred in the Project's earlier pilot programs, it is logical to predict similar behavior from those enrolled in the five-region Ohio project.

Observers

Observers include the media, student bodies, boards of education, the faculty, agency staff, professional associates, civic club members, test-site landowners, law enforcement personnel, and many others who see students, read reports, and in some way are related to the Project.

Most observers mentioned the environmental rather than the educational significance of the Project. They did not see the Project foremost as a learning process but as a means to correct problems in the environment. Probably the observers were accurately reporting the narrow range of investigations selected for the earliest focus.

The interpretations differed with each observer, a finding similar to the diversity of interpretations reported by students and their parents. This may confirm that either the program is diverse and/or that communications about its purpose and daily operations were not then well understood.

These statements were made regarding the program's benefits and detriments:

- The only problem I see is that we are unable to physically get enough students involved. This problem arises from the fact that the course is only offered after school hours.

- It has been beneficial because the students have learned 'firsthand' what is happening today.

- Beneficial—students learned the how's and why's of water testing including working under adverse conditions. Detrimental—they almost ruined my only pair of waders.

- They have learned experimental techniques associated with the problem and have realized the importance of the program. It was also beneficial to people from other communities which did not have the program available as well as our local community.

- I believe it instills the following characteristics:

    1. love of country; i.e., land, rivers, streams, mountains, etc.
    2. respect for others
    3. higher personal morale—'helping others'
    4. personal responsibility to get job finished

- Beneficial in all ways mentioned. This type of course may help draw the local community and its school closer together in terms of the roles of the schools and the community.

- The water testing program has certainly been beneficial to the student, the school, and the community. The student learns of water contamination, movement, testing programs and the need of water purification. The school benefits as the student participates in a learning situation and gains as the students relate their experiences to their environment and to their communities.

- It has taught them something to help the community and to help them later in school. From this the community might be influenced a lot more.

Conclusion

Although clearly popular with the participants, the Project nevertheless is not demonstrably absorbed by "the system." However, it is too early in the Project's evolution to prescribe an ideal model. Recommendations for implementation on a permanent basis will come later.

If the Project depends upon a funded graduate student coordinator, then the future bodes ill. If, instead, in-service assistance from universities, schools of education, administrative coordinators can be provided, then the Project's future brightens.

Also, the training package needs to be simplified, made less expensive, and produced in written and audio-visual units.

Finally, the type of experience provided to the student must be valued by all those using such a project. Growing needs for "career education," "applied science," "practical research" problems, and "community education" mandate such a program. Aware of those needs, the Institute works to align the program's design to help fill them.

Students who have taken such courses for several years eagerly assume responsibility, respect natural and social diversity, and practice the simple but indispensible know-how which the Project teaches. Accounting for those traits demands a rigorous examination of the course and its achievements.

Awards and Recognitions

The Institute has received the following awards and recognition during the evolution of the Watershed Heritage Project:

The President's Environmental Merit Award of Excellence	1972
The Ohio Governor's Award for Community Action	1973
A National Demonstration Project by U.S. Office of Environmental Education	1972-74
Exhibitor at EXPO '74, Spokane, Washington	1974
Ohio American Revolution Bicentennial Advisory Commission recognition	1975
American Revolution Bicentennial Administration National Program designation	1975
A Horizons on Display of the Department of Housing and Urban Development	1976

Note

This summary is fully reported in The Ohio Watershed Heritage Project, An Environmental Community Service for Secondary Schools, Volume VII of the Environmental Education Guide Series, 77 pages, $4.75, The Institute for Environmental Education, 8911 Euclid Avenue, Cleveland, Ohio 44106.

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ENVIRONMENTAL EDUCATION IN BILLINGS, MONTANA . . . AN OVERVIEW OF THE DEVELOPMENT AND COMPONENTS OF ONE PROGRAM, AND ITS RATHER SUDDEN EVOLUTIONS TO A NEW PROGRAM

by Wilson F. Clark*

As the author of this case study suggests, educational programs often seem to have many of the characteristics of organic bodies. They struggle in their formative years, then enjoy a period of flux, and finally attain a degree of maturity. At that point many become senescent, while some adapt to a climax environment. This is the account of such an evolution. 'Way back in 1952, the roots of an environmental education program were finding fertile soil in Billings, Montana. By 1975 the program had developed to feature the intimate involvement annually of a dozen college faculty members, several hundred college students, five federal resource management agencies, one state agency, the teachers and administrators of the local school district, parents, and civic leaders, with 1700 sixth grade children receiving some quite solid environmental education experience--all in the total absence of a federal grant. In 1975, however, various environmental impacts shattered the existing program. Fortunately a federal agency not hitherto known for its ecological conscience has emerged as a new catalyst, and in a new guise the program has evolved to serve more pupils than ever before. The root system was strong, and vital juices were present to permit adaptation. Dr. Will Clark tells the story with feeling.

INTRODUCTION

Educational programs often seem to have many of the characteristics of organic bodies. They often are slow and painful in being born, then have a period of rapid growth, followed by the attainment of some degree of maturity. At that point, many suffer a decline, a period of lesser activity, and eventual death. Some go through this "life cycle" quickly. Some take much longer yet still follow this pattern. And a very few pass from the mature stage, and change and adapt to the times, finally finding a permanent place in the public school and college curricula.

Environmental education programs seem to fit the pattern just described for most educational innovations. Probably very few to date have reached the status of being readily accepted by teachers, school and college administrators, and the public as a permanent part of curricula.

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These thoughts on the "life cycle" nature of educational programs came to mind in the process of the author preparing this report on the Billings, Montana environmental education program, for a solid program of 9-year's standing suddenly found itself in a period of rapid change, due to many circumstances. It is too early to say whether or not the change is for good or ill in terms of the permanence and quality of the program. We certainly hope it is for the good, and will evolve towards some degree of permanence.

The report traces the growth of the program, describes in some detail the many interlocking components, states the philosophy that guided the program, presents statistical information, touches on the financial aspects, describes the rather sudden changes of both content and structure, speculates on the reasons for those changes, and gives details of the new program.

AN OVERVIEW 1952 THROUGH 1975

Early efforts (1952-1966)

Environmental education at Eastern Montana College has its roots in a General Conservation Course started in 1952 by Dr. George Gloege, now Professor Emeritus of Chemistry. Also at that time was formed the Montana Conservation Council (MCC), that gave a focus for the public and school conservation education endeavors of various university system people and federal and state resource agency people. The MCC then for many years was the catalyst for bringing diverse groups together to build public understanding of resource problems. Such endeavors resulted over the years in much of the early and solid resource legislation in the state, and resulted in some fine conservation education publications for teachers. The MCC also was the common bond between the few university and agency people concerned with broad conservation education.

In 1954 the author joined the faculty of Eastern, with a then-unusual degree of Ph.D. in Conservation Education, and has been intimately involved in environmental matters with schools and with the public since that time. Through the Montana Conservation Council, an annual "Conservation Caravan" for teachers was offered for some eight years, and under MCC sponsorship a few teachers workshops were carried out by Eastern Montana College in cooperation with the Soil Conservation Service. But the public and school interest and support of the (then) conservation education efforts were rather low, and for many years it was a lonesome business. Yet one likes to think that those lonesome years did lay a foundation for the public concern in resource problems that grew so rapidly in the mid-1960's.

Program development -- the first 5 years (1967-1971)

1967 saw the start of the (now re-named) environmental education program in Billings. This came as the result of the combined efforts of five Eastern faculty members, one of whom (Professor Erick Erickson) was also principal of the campus elementary school. We conceived and carried out a camp program for 30 sixth grade students, giving them 48 hours in a mountain camp environment, where field investigations were carried out by the children. Four units were given to the children—water environments, land and wildlife environments, geology and geographic studies, and intensive study and exploration of a small plot of land. These units were entirely the discovery approach—the learning-by-doing concept. That first year the cost of some $15 per child was borne partly by the children's money-raising efforts, and partly by the parents. The instructional faculty contributed its time. A medical doctor also contributed two days—and also gave first aid instruction. A few college students served as counselors, and as recreation supervisors.

For five springs, the faculty group continued this program—with each year more schools asking to have their sixth grade children included, more medical doctors asking to go, and the Parent-Teacher Organizations of each school supporting the program financially. In that time (1967-1971) it grew from 30 children to 902 children. During those five years, teacher in-service workshops were offered by the same faculty team, and some 285 elementary teachers and principals received that training.

In 1969, the "Blue Cap" program was started. This gave college upperclassmen an intensive "Instructor Training in Environmental Education" course with the emphasis on field investigations by the sixth grade students. These college students became the resident instructional staff at the camp. In addition, in 1970 a counselor-training program was started, to give other college students the background to serve as cabin counselors and recreation leaders at the camp.

For those first five years, the major instructional load, the organization and administration, and the training of college students and of teachers were borne entirely by the college faculty team—over and above its usual continuing college assignments. At the very beginning, in 1967, the decision was made to not seek Federal funds, for we felt that if the program was viable, it would generate the school, community, and financial support needed. This faith was justified.

During those first five years, the school administrators had been very cooperative and supportive, but the college was really running the program. The schools had no significant financial input, for that had come from the wonderful community support the program generated and received from the Parent-Teacher Organizations, the medical people, and a few state and federal agencies.

In August of 1971, the two EMC faculty co-directors of the program (Professor Erick Erickson and the author) made a complete report and presentation to the School Board of Billings School District #2. In September of 1971 the board appointed Ed Heiser as "Coordinator of Environmental Education," and the school board agreed that the camp and in-school portions of the program would be administered by District #2, while Eastern agreed to continue the training of college students to work in the program, and to continue the in-service training of teachers. The board then also gradually moved into significant budgeting for the program. The financial picture for 1967-1974 is summarized in a chart at the end of this report.

Of particular interest, concerning the 1967-1971 program, is that in February 1972, the program was the recipient of one of only ten "Distinguished Achievement Awards for Excellence in Teacher Education," given by the American Association of Colleges for Teacher Education. The Billings entry was one of some 125 programs judged that year, as submitted from the some 600 member colleges, and it was the only environmental program selected.

THE FULL PROGRAM (1971-1975)

The environmental education program during the next four years expanded considerably. Its focus was still the sixth grade children, but not only those in School District #2, for four Catholic elementary schools, three other parochial schools, and a few outlying rural schools also became part of the program. The chart at the end of this article graphically shows the many components of the program, and they are described in detail in this section.

The Philosophy

Throughout the development of the program, the philosophy has had these aspects:

First, the instructional philosophy of the workshop and school program was one that used the "Discovery" approach in field work in a wide variety of units. That is, the method of instruction helps the teacher see that he or she does not need to be an expert—able to name everything, answer all questions, know all management procedures, or be a gushing fountain of facts and information. For both agency people and teachers, the instructional method gave them self-confidence in the field, in the classroom, and in communication and instructional activities.

Second, the program developed in both teachers and children the skills of inquiry and questioning, with the goal of helping people see how they can find answers and reasons.

Third, the program built toward both sensitivity to environmental matters and motivation to work and to teach to help solve environmental problems.

Fourth, the program resulted in the participants gaining a surprising amount of information as a result of the teaching method, and in developing their critical faculties.

Fifth, the program cut across many subject areas: language arts, the social sciences, some of the other humanities such as art and creative dramatics and music, science and mathematics.

The Components

A. College Input

1. The General Conservation Course

This 4-credit (quarter hours) course had been offered three to four times each year since 1952. The course in the 25 years has enrolled some 3400 students. (To put this into perspective, Eastern in 1954 had some 600 students; over the years the college has grown to a total of some 3300 students.) The course is a broad overview of resource problems. It is a requirement in the elementary education degree program, and has been the "feeder-course" for many other aspects of the environmental education program.

2. The "Blue Cap" Program

This program involved a 3-credit course in winter quarter, "Instructor Training in Environmental Education," that emphasized field investigations and the discovery approach to teaching. In the spring quarter these students were each assigned about three-quarter time in April to work closely with three classrooms of sixth grade students and their teachers, on many environmental education activities and investigations. This April work was a 6-credit "clinic" block. Then in May, these students moved to the mountain campsite, and served all month as the resident instructional staff in an 8-credit "internship", as the sixth grade children came to the camp in groups of 200 or so. These students early in the program acquired the name "blue cappers" because we issued them blue baseball caps at camp to distinguish them from the many other college students who had various other camp functions. These blue cap students were really the heart of the program, and while meeting their responsibilities so well they also gained invaluable experience in working with teachers and children.

3. Management Training

In the winter quarter of 1975 an Environmental Education Management Training Program was started. This involved five of the spring '74 "Blue Cappers." They signed up for a 16-credit block in spring '75. They were intimately connected with and involved in the actual planning and management of the total program, including scheduling, transportation, food services, medical arrangements, insurance, recreation, camp facilities, instructional program, and so on. In addition, each one served at camp for two weeks as assistant director. In April each member of this "management team" also supervised six of the new (spring '75) "Blue Cappers."

4. Recreation and Camping Skills

The Physical Education Division cooperated in the total program by training students in Recreation Leadership (PE 361—3 credits) and in Camping Skills (PE 405—3 credits), and those students helped out at the camp in those activity areas. In the last six years of the program about 150 such students have been involved.

5. Nature Crafts

The Art Department of EMC trained students in the Use of Native Craft Materials (course Ar 492—Environmental Design —3 credits), and for the last five years of the program sent about five students per year to the camp as art instructors.

6. Camp Counselors

With the large number of children using the camp, many adults were needed as cabin counselors. This need was met by the Education Division offering a workshop for college students (Ed 330—Counselor Training—3 credits). Each of these students then participated in one of the 3-day camp sessions, and were responsible on a 24-hour-a-day basis for the children assigned them, from the time of the children boarding the bus to go to camp until they again reached their respective schools. Over the years some 910 college students served in this capacity.

7. Workshops for Teachers and School Administrators

From the spring of '69 through the summer of '72, the college faculty team had some 300 teachers and administrators take the Environmental Education Workshop, a 3-credit, in-service course. This workshop after '72 evolved into the cooperative workshop program described under the Agency Input Section below. However, the college continued to offer separate workshops during the summer school sessions.

8. Summer Program

In the two summers of '72 and '73, the College and the Campus School cooperated in presenting a 4-week day-camp program for children going into grades 4 through 7. It was a completely self-supporting program, with a tuition to the parents of $60 in '72 and $65 in '73. Many school-ground activities and investigations were carried out, and PE activities of swimming, archery, and even rapelling were parts of the program. The program was staffed by experienced elementary teachers. While it was quite successful, it was discontinued after summer '73, because the per-child costs that would have had to be charged were going too high.

B. Agency Input

Consistently since the start of the program in '67 the Custer National Forest (with its main office in Billings) was supportive of the program. But it was not until the spring of '73 that it became directly involved. In the fall of '72 the Custer Forest, Eastern Montana College, and Billings School District #2 hosted a one-day conference of state and federal resource agency people. Each agency at the conference first explained its own environmental education endeavors, then much discussion followed concerning ways to pool efforts. Following the conference, and under the leadership of Tom Ellis of Custer, plans were made to set up a workshop program for teachers, offered by an interagency team. Several Billings-based agencies had previously sent, or then sent, people to one or another of the USFS Environmental Education training sessions held elsewhere in '72 and through the summer of '73. Subsequently, the EMC in-service teacher workshops were discontinued, and Eastern played a major coordinating and instructional role in the cooperative workshops, under the same college course number and credit as formerly.

The cooperative workshop program involved then and continues to involve five Federal agencies (the U.S. Forest Service, the National Park Service, the Bureau of Land Management, the Bureau of Reclamation, and the Bureau of Sports Fisheries and Wildlife), the Montana State Department of Fish and Game, the Billings School District #2, and the College. A total of nine such workshops have been held since the spring of '73, and some 335 resource agency people, teachers and school administrators have been enrolled. These workshops are usually intensive two-weekend sessions. On invitation of the supervisors of the six National Forests that lie in Montana east of the continental divide, a special workshop was offered in fall '75 for personnel of those forests plus school administrators from those forest areas. Further, at Medora, North Dakota, in summer '74, and at Fargo, North Dakota, in late spring '75, we fielded an instructional team from Billings to answer invitations to present the workshop and help train a nucleus of school, college and agency people who would continue that effort.

C. School District Input

The administration and School Board of Billings School District #2 actively supported the program since its start. The board in the fall of '71 appointed Ed Heiser as Environmental Education Coordinator for the district. He has been the college's contact with the schools and he served also as the Camp Director for the last four years of the program. The district started significant budgeting in spring '72.

Administrators or supervisors of Billings District #2 who were responsible for transportation, food services, art, music, physical education, special education, and the sheltered workshop program also all gave active support.

The keys to the success of the program lay with the many principals and teachers of the sixth grade children, not only of the District #2 schools, but also of the four Catholic elementary schools, three other private parochial schools, the Boys Ranch school, and several outlying rural schools.

A unique feature of the program of the last four years was the inclusion of many special education children in the program (physically handicapped and educable-mentally-retarded children). In the spring of '75 there was a special camp session for some 30 students who were trainable mentally retarded children, and also for about 25 people ages 14 through 40 who were in a local "sheltered workshop" program.

D. Community Input

The medical doctors in Billings have supported the program since its start. They would almost fight for the chance to contribute three days of their valuable time to the camp program. Each of the 8 to 10 separate 3-day camp sessions each spring had a medical doctor in camp. He was responsible for the medications children may have had to bring with them, for treating the normal cuts, bruises, traumas, and aches of active children and for handling more serious accidents to children and staff.

Since the inception of the program, the Parent-Teacher Organization of each separate school raised the money each year for its respective sixth grade rooms, through many ingenious ways, such as sales and carnivals. The children, too, had many fund raising activities that were also educational. In the nine years no sixth grade child was unable to go to camp because the fee could not be met. No federal grant funds were involved. And for the last four years (including spring '75) the district budgeted funds for items such as transportation, insurance, camp rental and supplies, but not for food.

THE RECENT CHANGE

Thus far, this report has described the Billings Environmental Education Program as it developed and operated from the spring of 1967 through the spring of 1975.

In the last two summers of that program, the Bureau of Land Management actively surveyed and inventoried several of its land areas near Billings to see if such areas could be used for environmental education programs. One particular area was selected, and when the Montana State Office of the BLM hired Mrs. Ginny Lewis in the fall of '74 as environmental educator, she immediately started developing a small pilot program in the spring of 1975, centered on the use of the selected BLM area as a field lab. That 1975 program, piloted with three schools, involved some 800 children of grades 1 through 5. Mrs. Lewis' notion was that her program would lead into the existing sixth grade program. Subsequent events prevented that, however. Associated with the pilot program was a special workshop on how to use the field area for environmental education, attended by 58 teachers from the pilot schools and a few other schools. This pilot program launched the Bureau of Land Management into a significant role in the Billings Environmental Education Program.

At this point one may well ask why a Federal land management agency was getting so involved in environmental education. The answer is best given by quoting directly from the Montana State BLM Office statement of "Educational Services offered by the Bureau of Land Management in Montana" (a fall 1976 statement):

> "The Bureau of Land Management, a resource managing agency in the Department of Interior, has by its very nature, an interest in Environmental Education.
>
> "BLM manages its national resource lands with multi-purpose objectives, serving a variety of publics. Education is one of many uses, because citizens knowledgeable about the environment encourage and understand good management policies and programs from their resource agencies.
>
> "It is our feeling that public participation in the decision-making process concerning natural resource management can be encouraged through educational assistance to schools, civic groups, and environmental action organizations as part of our public information service.
>
> "It is the desire of the Bureau of Land Management to provide a valuable educational resource to local communities in Montana.

"The basic goals of BLM in its environmental education program are as follows:

> a. To make known the availability of resources provided by resource managing agencies in the field of environmental education, environmental management, and public involvement.
>
> b. To promote responsible user feeling, connected to the natural environment, the importance of natural resources in providing man's basic needs, and the eventual trade-offs that result.
>
> c. To develop in participants skills in communication, identification, and group problem-solving, in order to stimulate responsible interest and involvement in environmental decision-making in their communities.
>
> d. To assist teachers in achieving in their students an understanding of the interrelatedness among man, his culture, and his biophysical surroundings."

With a mandate to the agency to be supportive of educational endeavors in resource matters, with a suitable area available (about 20 miles from Billings), and with an able environmental education facilitator on hand, the growth of a new program and a change of the existing program occurred quite rapidly.

But the program change was also triggered by other events and by some significant changes of attitudes. The last full operation of the original program was in the spring of '75. Problems of weather at the mountain camp (three feet of snow on May 1) caused a move to a ranch area near Billings, but the sixth grade children that spring still got the full field investigation program in the two days each child was at the ranch during the ten sessions run in this manner. So the weather plus the tightening school financing spelled the demise of the mountain camp program—and probably justifiably, for the camp was some 120 miles from Billings, presenting an expensive transportation problem.

But the initiation of the new program in '75-'76 also was a reflection of other signs of the times. In Billings as in many other communities across the nation, teachers were becoming more reluctant to do those many extra things and make those many extra efforts that characteristically had been the real foundation of innovative programs. Their reluctance but reflected the growing schism between school boards and teachers, as the teachers sought compensation commensurate with their view of their work loads, training, and contributions to society. Without belaboring, attacking or defending any of those arguments, it is true that in Billings a bitter teachers strike occurred in the fall of '75, and the close working relationships between teachers and school administrators degenerated considerably. These schisms and tensions were reflected in college—public school relationships also, in regard to developing for college students various practicum experiences in the schools. They were further reflected in the increasing reluctance of teachers to commit themselves to blocks of time for programs outside of the hours of the normal school day. And changes were also probably due to the "back-to-basics" attitude of many citizens who viewed anything beyond reading—'riting - 'rithmetic as educational frills.

For whatever was the cause, the events and changes resulted in (1) the mountain camp program being dropped, (2) the exclusive sixth grade nature of the program being very suddenly expanded to cover grades K through 6 in the '75-'76 school year, (3) the "Blue Cap" program, counselor program, and art and physical education programs in environmental training for college students being dropped, (4) many of the elementary teachers being now cast in the role of field instructors, (5) and the Bureau of Land Management lands becoming the focal point of a huge educational program.

In the fall of '75 and the spring of '76 the Bureau basically ran the new program, in close coordination with the school district. It held workshops for the teachers, with college and other agency people assisting as facilitators. In that school year 8379 children grades K-6 participated, with their teachers being the major field instructors. In '75-76, the 25 Billings School District #2 elementary schools were involved, plus six county schools, four parochial schools, and some special education and shelter workshop groups as well.

The field program involved at least one day at the site for every youngster. The site is representative of the semi-arid area of much of central Montana—open rolling range areas, ground broken by small but steep and rocky gulleys, and isolated stands of pines. The surface water is scarce, and is represented only by a small stock pond. Such land is fairly typical of the basic land heritage of eastern Montana youngsters.

In this area the children of the lower grades (K, 1, 2) were involved largely in activities to develop sensory perception and appreciation. The other children had some similar activities but also had an opportunity to do various environmental study and investigation activities.

At the end of the first full year of the new program, the school district assembled a coordinating committee of teachers and administrators. For the '76-'77 school year, the district hired a young woman who had worked closely with the BLM environmental education specialist. She serves as the coordinator, and the Bureau of Land Management is reducing its role considerably. By the end of the year, the BLM expects and plans on its functions being almost entirely one of maintaining the site, and assisting in various small ways. The program itself will be totally the province of the school district.

In the '76-'77 program, the grade-spread of children was reduced to grades 2 - 6. The second graders experience an interpretive trail. The third graders study natural cycles. The fourth graders look at resources and the community—a social studies and social values unit. The fifth graders concentrate on physical history. And the sixth graders may either come to the site for investigative studies, or may take an option of a field trip to some other area. This sequential instructional arrangement overcomes the problem encountered earlier of some teachers tending to repeat the same unit the children had the year before.

Thus far in the fall of '76, some 3080 children have used the area, bringing the total number of youngsters (spring '75 through fall '76) to 12,263. The special BLM/District teachers workshops (spring '75 through fall '76) reached a total of 313 people. The school district, in assuming full responsibility for the new program, is contemplating that future workshops be under the sponsorship of MEESA (Montana Environmental Education Service Association) a state-wide organization formed in 1975, made up of school, agency and college people.

One further program was instituted by the Bureau of Land Management. This was a summer day-program for children entering the fourth grade. In the summer of '75 over a period of six weeks, some 340 children enjoyed and had some valuable learning experiences in four days of field trips. That summer the parents paid $6 per child to the BLM, and it then supplied the buses and staffing. In summer '76, 316 children were involved, again at $6 per child, but paid to the school district, with the district then furnishing the buses. Each child in his four successive days in the program had four quite different experiences. One day was a visit to the "Land of the Dinosaurs"—looking at pre-history in the Pryor Mountains south of Billings. The second day was "Indian Day" at the BLM field site, where the emphasis was on how the early people here lived with and used the environment for shelter, food, clothing and arts and ceremonials. The third day was "Pioneer Day", with a visit to the town of Joliet involving learning about early settlers from the headstones of a cemetery, visiting some early cabins, and talking with old-timers. And the last day was a trip to the mountains and a hike into a back-country lake. Quite a program for fourth-graders! Yet, evidently, very successful. The field instruction staff, incidentally, was made up of college students, largely paid from work/study funds. And most of them were "graduates" of the old Blue Cap Program.

Evaluation

There is now in process an evaluation study that is endeavoring to measure to what degree the children's attitudes and actions concerning the total environment have been constructively modified by their exposure in the present environmental education program. The study is not completed as yet, but preliminary results seem to indicate that the program is indeed having some significant constructive effects on the attitudes and actions of the children. In retrospect, the author realizes that the early program was remiss in not building in an evaluation component. That earlier oversight is being remedied in the new program.

SUMMARY AND CONCLUSION

The Billings Montana Environmental Education Program stands as an example of what local initiative can do, coupled with broad cooperative efforts, and exclusive of the common Federal dollar dependence. The program, from small beginnings, developed through spring '75 to an intimate involvement of college faculty members, several hundred college students, five federal and one state resource agencies, and the teachers and administrators of the school district, with some 1700 sixth grade children per year receiving some quite solid environmental education experience. But in '75, tightening school budgets, changing attitudes and relationships among and between teachers, administrators and the school board, and also changes of college/school district relationships, were among those factors that seemed to have brought on the demise of the original program. Yet, fortunately for the children of Billings, a new program evolved and is now in operation. It reaches far more children than the old program, and is a remarkable example of a federal land managing agency making a very significant contribution to education. This new program is only in its second year of operation, and only the future can tell if it will be a lasting one. We certainly hope so.

The author must confess to some real regrets concerning the change, for the old program had unique components of community/parent/school/college/agency cooperation, some of which are now missing. The old program also was a vehicle for giving hundreds of college students (largely teaching majors) invaluable working-experience with children, plus training in environmental education. We're finding that quite a number of the college "Blue Cap" program students are now, as teachers in many Montana cities and towns, starting and carrying on modest environmental education programs of many kinds.

The job now (from the college's standpoint) is to encourage and support the new program to the fullest, to try to devise new means of involving our college students in real teaching experiences outside the normal "student teaching", to develop (as is now happening) new curricula and degree patterns that meet the growing need for environmentally literate people to function in non-school, public contact positions as well as in school situations, and to work intensively to help individual schools develop their own school areas as outdoor learning laboratories.

Despite the author's immediate regrets for the loss of a good program, and feelings of the college being now somewhat cut off from and shut out of the new program, there is great satisfaction in knowing that the old program plowed the ground, carefully nurtured the crops, and harvested seeds of increased environmental literacy, awareness, attitudes, and action that are the kernels from which a new program has sprung.

To refer again to the "life cycle" nature of educational innovations and programs alluded to in the Introduction, the Billings program experienced birth, vigorous growth, maturity and apparent stability, then a rather rapid and in some ways shattering change due to many factors. But it evidently had a sufficiently strong root system and enough vital juices to adapt, and to become quite a different type of program. That new program seems healthy and vigorous. With care, cooperation, and continuing creativity on the part of all people involved, it may well reach that rare position of becoming a truly integral and well-accepted part of the permanent school curriculum.

TABLE OF CUMULATIVE DATA

Billings, Montana, Environmental Education Program
(Period covered: Fall 1952 thru Fall 1976)

Component	1952-1966	'66-'67	'67-'68	'68-'69	'69-'70	'70-'71	'71-'72	'72-'73	'73-'74	'74-'75	'75-'76	Fall '76	Totals
A. College Input													
1. General Conservation Course	'52-'76 ▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	3,472
2. Instructor Training (Blue cap)				▬	▬	▬	▬	▬	▬	▬	▬		126
3. Clinic and Internship					▬	▬	▬	▬	▬	▬	▬		100
4. Counsellor Training					▬	▬	▬	▬	▬	▬			910
5. Art, PE supportive courses							▬	▬	▬	▬			175
6. Management Training										▬			5
7. EE extension courses	'55 ▬ '59 ▬						'71 ▬						90
8. 1-1/2 day Stimulator Course	'55 ▬												200
9. Workshops by faculty team				▬	▬	▬	▬	▬	▬	▬	▬	▬	407
B. Agency Input													
1. Cooperative Workshops								▬	▬	▬	▬		335
2. BLM special workshops										▬	▬	▬	313
C. Children Involved													
1. Sixth-grade School/Camp program		▬	▬	▬	▬	▬	▬	▬	▬	▬			7,634
2. Summer day-camp program (grades 4-7)							▬	▬					206
3. New BLM program (grades K-6)										▬	▬	▬	12,263
4. BLM summer day field excursion program										▬	▬		655

FINANCIAL ASPECTS OF THE ENVIRONMENTAL EDUCATION PROGRAM

ITEM	Spring 1967	Spring 1968	Spring 1969	Spring 1970	Spring 1971	Spring 1972	Spring 1973	Spring 1974
Transportation	Special contract arrangements with E.U.B. camp on the Boulder River.	$ 70.00	$ 426.80	$1,437.00	$2,191.80	$ 5,755.20	$ 9,357.64	$11,289.60
Food		519.16	1,225.00	2,530.23	3,345.81	6,796.30	13,916.00	5,110.87
Kitchen Services		120.00	700.00	1,434.00	2,245.00	1,777.50	Included in food based on $1.00 per meal	2,614.60
Insurance		43.55	90.00	239.50	544.00	626.00	497.00	501.50
Supplies and Camp Rental		64.00	80.00	289.50	1,000.00	2,774.00	4,850.52	6,518.34
Other Expenses		-0-	-0-	502.00	661.17	-0-	-0-	-0-
TOTAL COSTS		$816.17	$2,521.80	$6,432.28	$9,987.78	$17,729.00	$28,621.16	$26,034.91
Total Number of Children	30	52	190	485	902	1,102	1,518	1,598
Approx. Cost/Child[1]		$ 27.22	$ 13.27	$ 13.26	$ 11.07[2]	$ 16.09[3]	$ 18.85[4]	$ 16.29[5]

[1] Parent-Teacher Organization supported and financed fully, '67 through '71. Then School District budgeting gradually gave support.

[2] $11.07/child was cost based on total children planned for. Because of "no-shows" the cost per child actually in camp was $12.37.

[3] Student cost was $15.50/child. Additional cost was assumed by School District #2.

[4] Student cost was $17.50 per child for private school children and $12.50 per child for Billings Public School children. Additional cost was assumed by School District #2.

[5] Student cost was $12.50 per child for private school children and $8.75 per child for Billings Public School children. Additional cost was assumed by School District #2.

PROJECT SCATE (STUDENTS CONCERNED ABOUT TOMORROW'S ENVIRONMENT)

by Ronald Harshman*

If environmental education has done nothing else, it has demonstrated it can bring a heightened sense of relevancy to secondary-school civics instruction. A case in point is Iowa's Project SCATE (Students Concerned About Tomorrow's Environment), its primary goal active student participation in the political processes necessary to implement solutions to environmental problems. Led by science teachers, student teams investigated environmental problems and options. Led by social studies teachers, the students then debated the issues at regional and state assemblies, and presented the resulting resolutions to state legislators and administrators—with varied receptions. Interestingly enough, the caliber of student involvement seemed to surpass the caliber of curriculum development on the part of teachers. Team teaching is not easy.

OBJECTIVES

Project SCATE (Students Concerned About Tomorrow's Environment) is an environmental-issue-centered, political participation program for high school students and teachers, administered by the Iowa Department of Public Instruction. Three major goals for the project are:

1. Development of an educational program to help each student adopt a philosophy of life which views man as a participant in resource use and conversation.
2. Development of an educational program that emphasizes individual participation in the political process through which this life philosophy may be implemented.
3. Development of a central resource materials retrieval and dissemination system to facilitate communication to individual teachers about available resources in environmental education.

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FUNDING

The project is currently in the second year of funding by the Office of Environmental Education of the Department of Health, Education and Welfare. Funding is provided on a one-year basis, subject to renewal upon application. The total projected period for funding is three years. Project funding for the first year was $42,079, for the second year $31,549, and projected funding for the third year is $21,500.

OVERVIEW

Project participation involves students in the active investigation of local environmental issues. Students select an issue that relates to one of four general areas: land use policy development, economic considerations related to the quality of life, air and water quality, or energy allocation and consumption. Students then investigate the issue in their local community and determine alternative solutions to the problem.

Upon completion of their investigation, students develop a recommended solution to the environmental problem they have investigated. These recommendations are presented in committee to other student delegates at a regional SCATE assembly. In the regional assemblies, recommendations are amended or combined to form packages. Finally, they are voted upon by the full regional assembly to determine if they should be presented to the State Assembly.

The Project SCATE State Assembly is conducted in two sessions. In the Pre-Plenary Assembly, students meet in standing committees for each of the four general issue areas. Resolutions submitted from the regional assemblies are debated, amended and voted upon. Those resolutions receiving a favorable vote are reproduced for consideration by the Plenary Session the next day.

The Plenary Session of the Project SCATE State Assembly is open for participation by all students who have participated in SCATE investigations during the preceding months. Each student has the opportunity to voice his position on an issue under discussion and each student has a vote. The Assembly proceeds under the rules of parliamentary procedure.

During the Plenary Session resolutions passed in committee the preceding day are brought to the floor according to a pre-determined agenda. Each resolution is subjected to debate, amendment and vote by the full assembly. Those resolutions that are passed are printed in their final form and presented to state legislators and administrators of state agencies affected.

Resolutions passed by the 1976 State Assembly included:

> A resolution for limiting the temperature gradient of the thermal discharge of power plants along the Nebraska-Iowa border.
>
> A resolution for banning the sale of aerosol cans containing fluorocarbons 11 and 12 in the State of Iowa.
>
> A resolution requesting the monitoring of all fuel activities of nuclear power plants.
>
> A resolution for banning the sale of non-returnable beverage containers in the State of Iowa.

Comments of students who participated in Project SCATE during the first year provide an indication of the project's impact:

> "Doing the research for our resolutions and learning in one hour what we could not learn in a long time in school was fun."
>
> (Council Bluffs 9th grade participant)

> "I felt that Project SCATE was a worthwhile program. I not only found the opportunity to meet people, but I also learned cooperation, parliamentary procedure, compromise, and how a bill becomes a law. The youth leadership encouraged by Project SCATE was inspiring."
>
> (Clarinda student chairperson)

> "I talked with a state senator concerning the land use policy bill. I felt him to be rather condescending, but he listened. He is opposed to the bill, and by being chairman of the Natural Resources Committee, he kept it bottled up. He favored county zoning but not a state bureaucracy."
>
> (Cedar Rapids High School participant)

HISTORY

Project SCATE is the result of the combined effort of Richard Gage, Social Studies Consultant for the Iowa Department of Public Instruction, and Duane Toomsen, Environmental Education Consultant. Together, they conceived of a political participation program with an issue focus. The issues selected were those identified by the "Future—Iowa 2000" Conference held in 1972.

From the concern for a political participation program for high school students and the issue focus identified by the Iowa 2000 Conference, the two consultants developed a proposal for Project SCATE that was submitted to the Department of Health, Education and Welfare in November 1974. The project was funded under the Environmental Education Act in June 1975.

For the first year it was determined to initiate the project in only five of the fifteen Area Education Agencies into which Iowa had recently been divided. Contacts were also made with the Institute for Political and Legal Education, a Title III validated project from New Jersey, to provide the political participation training for the project.

In the spring of 1975, the Project Director, Duane Toomsen, met with representatives from the five area education agencies to plan orientation sessions for the fall. Orientation sessions were scheduled in each of the five areas for September, with Project SCATE workshops scheduled for October.

In August a project coordinator and project intern were employed and plans were developed for the orientation sessions and workshops. Plans were made to offer graduate credit for project participation through the University of Northern Iowa and a project advisory council was formed.

The orientation sessions conducted in September served to present to teachers and administrators in local schools the Project SCATE concept and to recruit participants for the October workshops.

To recruit participants at minimal cost to local participating schools, the Department of Public Instruction agreed to pay costs of substitute teachers, and to pay food and lodging costs for workshop participants.

Two project workshops were conducted in October of 1975. Fifty-six teachers and 86 student leaders participated in the four-day workshops. Participants received training in voter registration, campaigning activities and projects, lobbying techniques, community research and parliamentary procedure. In addition, they participated in activities providing awareness of issues in land use, energy allocation and consumption, air and water quality, and economic considerations related to the quality of life.

From October until December, participants developed and conducted investigations within their local communities. Topics investigated included:

Effects of aerosol containers on the ozone layer

Alternative energy sources and incentives for solar heated homes

Energy consumption in local schools

Thermal pollution of rivers by power plants

Run-off pollution by unregulated dumping of corn by-products

Support for statewide land use policy legislation

Water treatment in waste disposal plants

Banning of aluminum containers for beverages

On January 31, 1976, students met in four regional assemblies. In each assembly students met in committee to share concerns and develop their resolutions. The resolutions developed were then submitted to vote by the entire regional assembly. Those resolutions passed were provided to selected student delegates to be presented to committees at the Pre-Plenary Session of the SCATE State Assembly.

The Pre-Plenary Session of the SCATE State Assembly met on February 13, 1976. Delegates met in committee to debate the various resolutions submitted from the regional assemblies. As debate proceeded and the need arose, students were given further training in parliamentary procedure by two students from Drake University.

Resolutions passed by committee were prioritized and submitted for reproduction. The reproduced resolutions were distributed to all delegates prior to the meeting of the Plenary Session of the State Assembly on February 14.

On February 14, the Plenary Session was convened and a keynote address was given by S. David Freeman, Energy Policy Advisor to the Senate Commerce Committee. Following the address, the assembly began consideration of the resolutions passed by committee the previous day. The assembly considered 15 resolutions and passed 12 of these.

Following the State Assembly, the Project SCATE Regional Chairpersons determined to present their resolutions to the Iowa General Assembly. On March 14, the chairpersons met and talked with a member of the Iowa Public Interest Research Group to prepare for the presentation of their resolutions to members of the General Assembly. They were primarily concerned with whom they should talk to, how they should address the legislators and what each legislator's view on particular issues were.

On March 15, the student chairpersons entered the State Capitol, walked into the cloak room of the Iowa Senate, and began their efforts to gain support from the Iowa General Assembly for legislation similar to that supported by the Project SCATE resolutions. Unfortunately, no legislation supported by SCATE resolutions was passed during the 1976 General Assembly.

In May, 1976, notification was given that Project SCATE was re-funded for the 1977 fiscal year. Plans were developed for second year participation and workshops scheduled for August and September of 1976. Modifications in the program were made for FY 77. It was determined not to use the Institute for Political and Legal Education for political participation training, and to provide increased emphasis on the investigation of environmental issues during the workshops. The decrease in funding for FY 77 made it necessary not to reimburse school districts for substitute teacher costs and to reduce the workshop to three days. Inability to pay substitute teacher cost has reduced participation, but the extent cannot be determined at this time.

EVALUATION

The primary goal of Project SCATE, active student participation in the political processes necessary to implement solutions to environmental problems, was proven viable by first year activities. High school students proved capable of undertaking investigations of environmental issues and developing resolutions to implement solutions to those issues. Pilot year activities indicated a development in the understanding of political processes and an increase in positive attitudes toward political participation.

During the pilot year an instrument was developed and piloted to evaluate the attainment of project objectives. At present the instrument is being tested for reliability. If the instrument proves reliable, a formal evaluation of student attainment of project objectives will be undertaken during year two. Observations made during the pilot year will be tested at that time.

Difficulty was encountered in the development of a central resource materials retrieval and dissemination system. Existing materials were capable of being retrieved through the existing INFORMS (Iowa Network For Obtaining Resource Materials for Schools), and were disseminated to participants in packet form at the workshops. Additional resource information was provided through implementation of a newsletter, SCATELINES. However, retrieval of usable curriculum units from project participants was not highly successful.

Two constraints served to limit the development of curriculum units by project participants. First, the time limitations of the first year were such that teachers found difficulty in providing time for students to complete an investigation and develop a recommended solution. For most, to attempt to develop the process into a curriculum unit was difficult to impossible. Time was not available.

The second constraint was an inadequate understanding of the Project SCATE concept. Initially, teachers found difficulty in relating curriculum units in science or social studies classes to the combination of scientific investigation and political participation emphasized by Project SCATE. Generally, teachers did not fully comprehend the relationships until the completion of the State Assembly. By that time they found it difficult to retrace their steps and organize the procedures they had somewhat stumbled through.

It should also be noted that the project coordinator and director were also vague in their understanding of the project concept. The concept as a theory was clear, but the working model for curriculum development had not materialized. The necessity of working through the procedures for one year prior to attempting to retrieve curriculum units became very apparent. For the second year university credit for participation is being developed as a means to insure curriculum unit retrieval.

Subjective evaluation from the project advisory council and solicited from project participants proved to be an effective means to evaluate and refine the project design during the first year. Feedback from participants provided a means to determine the elements of training to be retained in the project workshops and elements to be added. They also provided additions to be made to the total program and aspects that could be strengthened by clearer communication to participants.

Specific refinements that were suggested by participant feedback were: increased emphasis upon environmental issues during the workshop, increased preparation in parliamentary procedure for participants, provisions for student chairpersons to present resolutions to legislators, and development of procedures for individuals to follow in supporting resolutions after the State Assembly. Advisory Council members provided evaluation and validation of the instrument developed for project evaluation, in addition to continuous assessment of the project.

In summary, the participation aspect of Project SCATE was successful. Students were able to participate in political processes to a much greater extent than was anticipated for the first year. The curriculum development component was less successful. The time required for administration of the participation component during the first year did not allow time for teachers or project staff to emphasize curriculum development. Therefore, curriculum development was assigned as a priority for the second year.

PROJECT KARE (KNOWLEDGEABLE ACTION TO RESTORE OUR ENVIRONMENT)

by Matthew M. Hickey*

Responding to a 1971 education needs assessment in a five-county area in southeastern Pennsylvania, concerned citizens recognized the region was experiencing serious environmental problems and that action-oriented environmental studies were requisite, featuring a multi-disciplinary, cooperative approach on the part of public and non-public schools. With federal funding emerged Project Knowledgeable Action to Restore Our Environment (KARE), pledged to the philosophy that students, teachers, and community members can work together as co-learners as they directly experience and deal with real problems of the real world, and dedicated to the strategy that the primary goal in dealing with human-created and natural environments is the development of attitudes and understandings rather than strictly the exposure to information. Rigorous evaluation has since indicated that Local Action Programs (LAPs) do make a difference, and KARE is now focused on extending its approach to K-12 environmental education nationwide. This case study is a prime example of process at work in process education.

Pupils, however, are not all natural investigators, nor without special training can they successfully engage in and bring closure to environmental investigations of their own choosing. So environmental educators of process bent have found that before one can unstructure the classroom for autonomous research, one must structure a learning design which focuses on selected cognitive skills.

Project KARE aims to strengthen Environmental Studies in local school curricula, grades K-12. Specifically, the project encourages local schools to:

1. Achieve effective awareness of environmental problems and methods for restoring our environment.
2. Involve students integrally in planning and conducting activities for environmental studies.
3. Teach, experience, and learn regional cooperation in environmental problem-solving.
4. Utilize "process" learning approaches which are action-oriented and interdisciplinary.
5. Identify and make use of local human and materials resources.

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6. Foster on-going community participation in environmental studies.

These objectives were formulated in response to a needs assessment performed by Educational Research and Development Associates (ERANDA), West Chester, Pennsylvania during March, 1971. Based on a selected, representative, stratified sample of 262 students, teachers, and community persons, ERANDA found that southeastern Pennsylvania was experiencing serious environmental problems and that action-oriented environmental studies were requisite.

In particular, respondents indicated that the problems relating to waste disposal, water quality, and transportation constituted principal concerns.[1]

FUNDING

Since 1971, Project KARE has been sustained year-to-year by a variety of grants from major funding sources, including:

- Elementary and Secondary Education Act (ESEA), Title III, Section 306 (thru USOE, DHEW)
- Environmental Quality Education Act of 1970, P.L. 91-516 (thru USOE, DHEW)
- Elementary and Secondary Education Act (ESEA), Title IV, Part C (thru Pennsylvania Department of Education).

With additional small grants from local firms, Project KARE has averaged over $223,000 per year in funding. However, *all* operating funds, regardless of source, should be regarded as "soft" since local taxation support has never been achieved. Beginning October 1, 1976, Project KARE commenced coordination of a three-year energy education project known as E3 (Energy, Economics, and Environment). Funds, amounting to $94,646 during 1976-77, are being provided by the Pennsylvania Department of Education under ESEA, Title IV, Part C. This project, as with Project KARE, serves the five-county region of southeastern Pennsylvania.

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[1] *Five-County Regional Environmental Project, a Proposal*, Montgomery County Intermediate Unit, Norristown, PA, May 21, 1971, pp. 15-22.

TARGET AUDIENCES

During developmental activities, 1971-75, the primary target audience was schools in the five-county southeastern Pennsylvania region. The target population exceeded 1,000,000 students in grades kindergarten through twelve. They were enrolled in 69 separate public-school systems and over 300 individual non-public schools. Nearly 68 per cent of the students were Caucasian, 30 per cent Negro, and 2 per cent other racial origins. Almost 25 per cent of the students attended non-public schools. An estimated 84 per cent of the total student population resided in urban and densely-populated suburban communities. Families within the five-county region represented all socio-economic levels.

Starting July, 1975, Project KARE began to reach out with training programs available to all 505 public school systems and the many non-public schools throughout Pennsylvania. The audience consisted specifically of teams representing students, teachers, administrators, and community persons from selected schools. Concurrently, with entry of Project KARE into the National Diffusion Network (NDN) of USOE, schools throughout the country became eligible for environmental studies training.

HISTORY

After 5½ years, Project KARE is still alive! (See Appendix B, KARE Milestones.) The intrinsic philosophy of learning, and knowledge regarding curricular change, are traceable to January 28, 1970.

Beginnings

Conceptually, Project KARE began when representatives of the five sponsoring Intermediate Units met to discuss a joint, consortium-type project. The Intermediate Units of Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties provide services such as special education, vocational-technical schools, and curriculum planning to school systems within their boundaries. Until Project KARE, little evidence existed showing that the Intermediate Units could work cooperatively on joint projects. But the Executive Directors and their representatives persevered, since only through a consortium could sufficient "outside" funds be secured to operate the type of project they perceived. Specifically, project staff would avoid reinventing the wheel.[2] Rather, staff expertise and "seed" grants would be provided to the 69 public school districts and over 300 non-public schools in the region. The Steering Committee, representing the Intermediate Units, the Roman Catholic Archdiocese, and the Model

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[2] Minutes, Steering Committee, January 28, 1970.

Cities Program, began to convene monthly. First order was to establish focus for the project. Various curriculum areas were considered, including drug education, environmental education, and global studies. On March 3, the Steering Committee recommended a concentrated effort on environmental education through a multi-disciplinary curricular approach.[3]

During succeeding months, the Steering Committee identified regional resources, listed environmental concerns, and researched potential sources of funding. Soon, two consultants, Donald L. Wright and John H. Jarvie, were retained to draft a proposal containing the recommendations of the Steering Committee.

The Proposal, approved by the Sponsoring Intermediate Units, was submitted to USOE, Division of Plans and Supplementary Centers, on May 21, 1971 in response to requests for Special Projects under ESEA, Title III, Section 306.[4] As it was then known, CARE was to be housed in the Norristown (later Blue Bell) offices of the Montgomery County Intermediate Unit. Norristown was the heart of the region, making travel to client schools convenient and less costly. Three major ideas formed the conceptual backbone of the proposal:

1. The development of additional curriculum materials is not pertinent except when devised by local projects.
2. An environmental resource center should be established and operated by project staff.
3. Local projects in satellite schools are the main activities of the project.[5]

Developmental Stage

Project CARE (later KARE) was established July 1, 1971, by direct USOE funding amounting to $255,000 for twelve months. By September, a total of eight staff members was recruited: Director, Assistant Director, Environmental Specialists (2), Field Coordinators (2), and Secretaries (2). Never again were so many KARE staff available to serve local schools. During Fall, 1971, several major tasks were accomplished: revise evaluation design; devise proposal guidelines for Local Action Programs (LAPs); establish the Environmental Education Resource Center (EERC); and delineate Environmental Studies Consultant Services (ESCS).

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[3] Minutes, Steering Committee, March 3, 1970.

[4] Five-County Regional Environmental Project, a Proposal, Montgomery County Intermediate Unit, Norristown, PA, May 21, 1971 (95 pages).

[5] Ibid., p. 12.

Concurrently, the "KARE Philosophy" became formulated during frequent heated discussions amongst KARE staff. This was to be a painful experience, since most staff joined the project with rich experiences in environmental studies and pre-conceived personal philosophies. Conflicts of attitude, style, and perception were inevitable! Eventually, the tenets of a KARE approach emerged.[6] The KARE philosophy holds that students, teachers, and community members can work together as co-learners as they directly experience and deal with real problems of the real world.

Key elements of this philosophy include:

1. Students possess the ability to determine, in cooperation with each other and with adults, their environmental educational program and the particular means to be utilized in problem investigation. An outgrowth of this process will be continuing self-learning.
2. The perception of the need for acquired knowledge and skills will become evident to the students as they become familiar with the complexity of human-created and natural systems.
3. As the students progress they will develop a holistic approach, which will lead to the synthesis of methods of problem investigation and to the understanding of the interrelatedness of the components of systems.
4. The students will develop a mature sense of interpersonal relationships which allows them to listen to others and to work effectively as members of teams.
5. Direct experiences will stimulate the students to recognize their responsibilities from a long-range point of view. They will understand and assume a significant role in society.
6. Teachers involved in this process will move from an authoritarian stance to a position where they are able to enjoy learning with students and where they will be able to offer advice and guidance when sought out by the students.
7. Changes will occur in the present institutions because of the many positive outcomes generated by the implementation of the above.

The primary goal in dealing with the human-created and natural environments is the development of attitudes and understandings rather than strictly the exposure to information. In a process approach, involvement leads to content. There is considerable evidence in the literature to support process education techniques as well as action-oriented activities.[7,8]

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[6] The KARE Philosophy, Project KARE, Blue Bell, PA, 1972 (2 pages).

[7] Linn, Marcia C. and Herbert D. Thier, "The Effect of Experimental Science on Development of Logical Thinking in Children," Journal of Research in Science Teaching, 1975, pp. 49-62.

[8] Macbeth, Douglas R., "The Extent to Which Pupils Manipulate Materials and Attainment of Process Skills in Elementary School Science," Journal of Research in Science Teaching, 1974, pp. 45-52.

The implication of much of Piaget's work, for example, is that involvement of children in hands-on activities with manipulative real problems aids cognitive development.[9,10]

Operationally, the KARE Approach holds that curricular revision is most effectively achieved if pursued in small incremental changes within individual school organizations. Prospective environmental studies revisions should:

1. Originate as ideas conceived by the clients who have assessed the "state-of-the-art" within their own learning structure.
2. Deal with real environmental problems of the school community.
3. Be supported by appropriate consultant/technical assistance from the project.
4. Engage strong evaluation techniques at instructional, management, and institutional levels of project activities.

The KARE philosophy and operational facets of the KARE Approach were amply tested during 1971-72. A total of 17 LAPs directly involving over 20,000 students was conducted. Each LAP school engaged in a variety of instructional activities dealing with specific environmental problems such as stream pollution, community deterioration, and air contamination. Nearly $86,000 in KARE funds were used by the LAPs to provide for costs relating to instructional materials, equipment, transportation, and salaries of substitute teachers. KARE staff served as technical advisors to the LAPs, meeting with LAP staff on a once-weekly basis.

Meantime, the EERC began to serve dual objectives: to support the activities and professional development of project staff and to provide students and teachers with information, research findings, and materials relating to environmental education. During the year, over 600 separate items were acquired, catalogued, and annotated. The annotations were printed on 3" x 5" cards, and 50 sets of cards were distributed to EERC users in the region. Concerning ESCS, over 185 staff visitations were made to local schools. Consultant services included site analysis, curriculum evaluation, needs assessment, facilities development, and in-service training.

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[9] Inhelder, Barbel and Jean Piaget, Growth of Logical Thinking from Childhood to Adolescence, Basic Books, NY, 1958.

[10] Sayre, Steve and Daniel W. Ball, "Piagetian Cognitive Development and Achievement in Science," Journal of Research in Science Teaching, 1975, pp. 165-75.

KARE Curricular Guides and Films

Through contacts with teachers and students, the KARE staff became aware of the dearth of quality curricular materials relating to action-oriented environmental studies. However, materials development was not a major objective of Project KARE. Consequently, a supplemental $15,000 grant was obtained from the Office of Environmental Education, USOE, for the specific purpose of preparing curricular guides to aid educators in establishing interdisciplinary approaches to learning which foster contemporary problem-investigation. The materials were designed to involve students in real-world situations. This involvement allows students to perceive the need for developing process skills, which lead to cognitive understanding. Students and teachers cooperatively produced the curricular guides which were revised after field testing. A total of four guides was produced in 1972-73, and an additional seven during subsequent years. Titles of the KARE curricular guides are:

- Water Pollution Equipment and Environmental Studies (116 pp.)
- Solid Waste and Environmental Studies (310 pp.)
- Birds, Bugs, Dogs, and Weather and Environmental Studies (144 pp.)
- Selected Environmental Topics for Use With Elementary and Junior High School Students (130 pp.)
- Interdisciplinary Environmental Studies (193 pp.)
- Electric Power Generation and the Environment (145 pp.)
- Environmental Studies for Students with Special Education Needs (120 pp.)
- City Street: An Outdoor Classroom (32 pp.)
- The Cemetery: An Outdoor Classroom (32 pp.)
- In-Depth Environmental Studies (236 pp.)
- School Sites (39 pp.)

In agreement with USOE, the first three guides were submitted to the Institute for Environmental Education (IEE), Cleveland, Ohio, for nationwide distribution. After two years, an opportunity arose to film activities of selected LAPs. Two films were produced:

> Urban Studies: Two Ways—(14 minutes, color 16 mm, 10% syncsound). This film documents the activities of one Local Action Program across a full year. Students decide to renovate abandoned houses on one city block in the Model Cities area of Philadelphia. Depicted are procedures for establishing Local Action Programs through the KARE Approach.
>
> Environmental Studies—The KARE Approach—(18 minutes, color 16mm, 50% syncsound). This film shows the activities of 12 different action programs involving various environmental problems, including water quality, cemetery studies, air pollution, soil quality and noise pollution.

Summary of Developmental Stage

The developmental stage lasted four years. During that period, staff refined and enhanced the KARE Approach to strengthening environmental studies in local schools. A key function of Project KARE continued to be the operation of LAPs. Carefully detailed proposals were solicited from constituent schools. The proposals outline potential learning activities which can be incorporated into the on-going curriculum of the recipient LAP school. A total of 202 LAP proposals were submitted by local schools. Each year, a Blue-Ribbon Committee of environmental educators not connected with Project KARE convened to perform the selection process. The Committee rated the proposals on the basis of potential activities which might achieve the Project KARE objectives.

From 1971 through 1975, a total of 75 LAPs was conducted. Each LAP based learning activities on specified local environmental problems, including community deterioration, water pollution, and solid-waste mismanagement. Also, each LAP provided multidisciplinary instructional activities and engaged in cooperative learning activities which emphasize the urban-suburban-rural aspect of environmental problems. On average, a LAP received $3700 which supported the purchase of equipment and materials, transportation costs, and occasionally, extra-duty teacher salaries. Further, each LAP was assigned staff Environmental Education Specialists who provided the LAP with technical assistance including curriculum design, facilities development, and in-service training. Since 1971, more than 82,000 local students were integrally involved in Local Action Programs. By nature and intent the LAPs are highly-structured processes for establishing curricular changes in environmental education. By 1973, however, it was apparent that some worthwhile projects did not fit the process model for LAPs. Accordingly, Special Projects represented operational departures from LAPs. Selected on the recommendations of the Sponsoring Intermediate Units, a total of 25 Special Projects included the Montgomery County Administrators' Environmental Education Retreat; Interdisciplinary Environmental Studies Workshops; the Chester County Environmental Education Council; and Power Generation and Environment Course.

Meantime, housed in Project KARE offices, the EERC amassed printed and equipment resources including ERIC documents, The Environmental Index, periodicals, newsletters, and a plethora of pamphlets pertaining to environmental topics. By 1975, over 3500 separate documents were maintained in multiple copies for distribution on request. Each year of project operation, at least four Environmental Education Specialists were employed to serve as technical advisors to Local Action Programs. The Specialists also provided to non-LAP schools a variety of consultant services free upon request. The services included:

In-Service Training
Materials Design
Site Analyses
Curriculum Design
Facilities Development
Curriculum Evaluation
Needs Assessment
Continuing Education

Since 1971, a total of 106 site analyses have been performed. A Specialist visited the school campus or site, prepared a detailed map projecting potential use for Environmental Studies and submitted to the client a report containing possible learning activities and site improvement suggestions. Additionally, over the four years, 135 in-service programs were conducted for over 10,000 teachers in 108 separate public and non-public schools.

The LAPs and Special Projects regularly utilized parents, community, and regional resources in planning and conducting instructional activities. For example, each LAP organized a Local Advisory Committee consisting of at least six community persons who reviewed LAP activities and provided support for the programs. Also, the LAPs provided opportunities for intervisitations with resources and schools in other demographic areas of the region. This assured that appropriate regional resources for Environmental Education were utilized effectively.

The developmental stage permitted considerable experimentation, research, and rethinking concerning all aspects of the KARE Approach. It was a time for doing, redoing, and sometimes, undoing. Several key learnings were to influence markedly the KARE diffusion activities, including:

- The LAPs required far less money than anticipated to operate effectively. During 1971-72, the LAPs averaged $6500, while no LAP exceeded $3500 in 1975.
- In-service programs should include administrators as integral members of participant teams. Since the ultimate decision regarding curricular change rests with the administrator, it is imperative that he/she be immersed fully in the training process.
- The major purpose for establishing the EERC was to achieve usage by students and teachers. A modicum of usage was never achieved. The utilization of annotated file cards was unworkable. However, encouraging teachers to bring "shopping bags" to the EERC and select multiple copies of documents was moderately successful.
- A considerable difference exists between a LAP proposal, and LAP staff capabilities. Close this gap with a pre-LAP training program covering process education, management responsibilities, and techniques for resources utilization.
- Maintain careful archives of all printed references to LAPs and other KARE activities. To date, over 900 items are contained in the archives, including newspaper accounts and journal articles.

Diffusion Stage

The Diffusion Stage actually commenced on May 14, 1975. That morning, Matthew Hickey, KARE Director, and Janet Seidel from ERANDA, appeared before the Joint Dissemination Review Panel (JDRP) of USOE and the National Institute of Education. After reviewing testimony regarding program effectiveness, the seven JDRP members voted approval unanimously. JDRP approval made KARE: 1) eligible for ESEA Title III, Section 306 funding from USOE, and 2) a member of the National Diffusion Network (NDN). Subsequently, KARE received funds amounting to $130,000 in a Diffusion Grant. This grant, and entry into NDN as a Developer/Demonstrator (D/D) project, signaled critical change for KARE. During 1971-75, the project developed an approach to strengthening environmental studies in local schools of southeastern Pennsylvania, grades K-12, inclusive. Now the project would be committed to sharing the "KARE Approach" with schools throughout the country. As stated in the program proposal to USOE, KARE objectives during 1975-76 were:

"1. To disseminate the KARE Approach and Curriculum Materials as well as other technical reports and materials of the project.

"2. To train school staffs and students from other areas in using the KARE Approach for curricular revision.

"3. To provide technical assistance including site analyses, facilities development, and in-service programs to requesting schools."

To achieve these objectives, Project KARE conducted 21 three-day Action Workshops for 113 schools and 565 participants in 11 states from Maine to Oregon and in-between. An Action Workshop is the primary device for facilitating the adoption of the KARE Approach by local schools. Teams of teachers, students, community persons, and administrators represent individual schools in the three-day Action Workshops. The teams achieve the following: 1) a plan for implementing a LAP; 2) process-education skills; 3) evaluation techniques; and 4) a complete set of KARE curricular activities guides. Prior to a workshop, the teams inventory community environmental problems and resources and assess the need for environmental studies offerings in their school curricula. During the workshop, essential activities include preparation of a LAP proposal, development of environmental studies skills and design of evaluation procedures. At various stages, the participants get "down-and-dirty" performing environmental studies tasks of collecting and analyzing data from field studies. Following the workshop, the teams implement their LAPs with continuing assistance from KARE staff.

Demand for the three-day Action Workshops was encouraging. It was anticipated that KARE might conduct 15 workshops for schools throughout the country. By June 30, however, a total of 21 workshops was conducted. It is noteworthy that 17 schools (15%) were non-public.

Costs for workshops were shared among sponsoring State Facilitators, the participating schools, and Project KARE. At the culmination of each workshop, participants are requested to evaluate the workshop on a rating scale of 1 to 5 ("poor" to "outstanding"). The average rating for the 21 workshops was 4.5.

Dissemination activities also were encouraging. A total of 46 Awareness Sessions was presented, attended by at least 10,264 participants. An Awareness Session is generally an information meeting attended by relatively large audiences in order to apprise them of the services available from KARE. During a typical awareness session, the KARE 16mm films are shown, a question-and-answer period is included, and an information display is available to participants. Brochures and KARE descriptors often are distributed. Further, KARE was cited over 75 times in prominent journals, newsletters, and local publications. Locally, KARE staff performed 9 site analyses for schools, conducted 13 in-service programs for 353 school personnel, and provided at least 39 staff-days of technical assistance in Environmental Studies to local schools free-of-charge. Also during 1975-76, KARE functioned as a Developer/Demonstrator project in the Pennsylvania Diffusion Plan (PDP). Funded under ESEA, Title IV-C, this effort included a total of six Action Workshops for 28 schools and 172 participants throughout Pennsylvania.

Between July and December, 1976, KARE staff conducted eleven more Action Workshops bringing the total to 32 in the Diffusion Stage. These workshops have been conducted for 165 schools and 805 participants.

EVALUATION

Under Title III, Federal guidelines, Project KARE utilized a management-systems approach. Both products and processes of project activities are described in performance terms and measured accordingly. Evaluation has been conducted by an independent education evaluator, Educational Research and Development Associates, Inc. (ERANDA) of West Chester, Pennsylvania. Bernard Cohen Research and Development (CR&D) of New York City, New York has provided independent audit services. The auditor serves the project by 1) evaluating the evaluator, 2) determining appropriateness of instruments and data analyses, and 3) participating integrally in yearly development of an "Evaluation Design". The Evaluation Design was written (later revised) cooperatively by the project management, evaluator and auditor at the beginning of each project year. For 1973-74, for example, the Evaluation Design consisted of 169 separate product and process performance objectives in nine cells: Instruction, Management, Technical Assistance, Regional Cooperation, Community Support, Staff Development, Dissemination, Materials Production and New Dimensions. Three types of growth measures are made: 1) statistically-significant improvements, 2) non-obtrusive measures, and 3) criterion-referenced achievements. Using these measures applied to respective performance objectives, the evaluator assesses project growth, and submits three reports during the year: Implementation Report, Interim Report, and Final Report. The auditor submits corresponding reports after analyses of evaluation reports and procedures (see Appendix C, Evaluation Evidence). Evaluation strategies are summarized as follows:

Product	Effectiveness	Performance Standard/Criterion
General Cognitive Growth	General EE Cognitive Instrument	Significant difference at .05 level between experimental and control groups
Localized Cognitive Growth	Local EE Cognitive Exams	Significant difference at .05 level, pre-post testing.
Mastered Competencies	Skills Mastery Scale	Mean rating of 3 or better on five-point scale.
Attitudinal Growth	General EE Attitude Instrument	a) Significant difference at .05 level between experimental and control groups b) Significant difference at .05 level, pre-post testing.
Effective Learning Atmosphere	Ryan and Seidel Observation Scales	More than neutral on the two scales.
Behavior Changes	Anecdotal Records	Critical incidents.

Effectiveness of KARE Approach

During 1971-75, Project KARE conducted 75 LAPs. The LAPs are operational mechanisms for implementing the KARE Approach. The end product, however, is cognitive and affective growth by participating students. In evaluative terms, instructional performance objectives are:

1. Target students will demonstrate knowledge concerning the environment. This will be evidenced by the students who:
    a. Demonstrate a statistically significant increase in knowledge of general facts concerning the environment.
    b. Evidence a statistically significant increase in specific knowledge of fundamental environmental facts.
    c. Demonstrate competencies and skills learned in relation to specific environmental concerns.

2. Target students will demonstrate positive attitudes toward the environment. This will be evidenced by the students who:

   a. Exhibit positive attitudes toward environmental learning experiences.

   b. Exhibit through observable behaviors positive attitudes toward improving the environment.

   c. Participate voluntarily in school-related activities involved in understanding, solving or publicizing environmental concerns.

   d. Participate voluntarily in community activities that support improvement of the environment.

   e. Grow in positive attitudes toward improving the environment.

The LAPs differ exceedingly in demographics, organization, student composition, theme or focus, grade level, learning devices and location. However, the common denominators of all LAPs are recognizable; each utilizes the KARE Approach, each employs the same instructional performance objectives for student growth, and each uses similar evaluative measurements.

Overall Effectiveness of KARE Approach

A broad strategy for assaying the effectiveness of the KARE Approach is to look at the success of a group of LAPs in attaining instructional performance objectives. During 1973-74, a total of 22 LAPs was conducted. Students in each LAP were subjected to six evaluative measures: Local Cognitive Exam, Skills Mastery Scale, General Environmental Attitude Instrument, Ryan-Seidel Observation Scales and Anecdotal Records which correspond to specific instructional objectives. Table I (see Appendix D, Evaluative Data) shows that eleven LAPs met or exceeded objectives on all six measures, while an additional seven LAPs achieved five of the six objectives. A more complete analysis is contained in Table II, which shows that students in 21 of 22 LAPs equalled or exceeded the .05 level of probability for a pre-post test significant increase in knowledge concerning the environment on the Local EE Cognitive Exams. Table I shows similar gains by students in all 22 LAPs as measured on the General EE Attitudinal Instrument (.05 level) and on the Ryan-Seidel Observation Scales. Now, examine the complete evaluation of two selected LAPs.

Evaluation of "Operation Adoption"

This LAP was conducted during 1972-74 at Rhodes Middle School in the Model Cities area of Philadelphia. As an inner city program, Operation Adoption concerned itself with abandoned houses and cars, litter and graffiti. A total of sixty students participated. The program was developed to compare the traditional method of teaching students with an action-oriented approach. The traditional (contrast) group was housed in an intact classroom and taught about inner-city environmental problems and possible solutions. The action-oriented group (experimental) went into a nearby area and worked to "clean-up, paint-up and fix-up." Additionally, a control group was used. On the General Environmental Education Attitude Instrument, both action and traditional groups scored significant increases, with the action group outscoring the traditional (see Table III). In comparison with both the traditional and control groups, the action group scored an F-ratio of 10.31 which was an improvement in attitude exceeding the criterion ($\alpha = .01$) (see Table IV).

On the General Environmental Education Cognitive Knowledge Instrument, the action group grew in knowledge significantly greater than the traditional and control groups (see Table V). Similar gains were achieved by the action group on the Local Environmental Education Cognitive Examination and the Skills Mastery Scale. During Operation Adoption, the School Morale Scale, a nationally standardized attitude measurement, was applied to the action and traditional groups. This scale, Likert-type, measures seven aspects of a student's attitude toward school using 84 items, distributed in scoring from possible 0 (lowest negative attitude) to possible 1 (highest positive attitude). Table VI presents the scores as means, pre- and post-test. Analysis of covariance was performed. For a .01 level of significance, an F-ratio of 7.31 was required. Note that the action group surpassed the traditional group in all seven categories, as well as on the total scale.

Evaluation of "KAREBROOK"

During 1973-74, the Meadowbrook School in Abington Township conducted a LAP. A total of 80 students participated in LAP activities at various levels. This school is private and enrolls 130 students in grades K-8. The prime objective of the LAP was to develop facilities in the community for environmental studies. Students at all grade levels became involved in moving wood chips and hauling railroad ties to build a bridge. The township fathers provided land for the center, and the state built the parking lot. Learning activities included plant and animal identification, macroinvertebrate studies, stream surveys, mapping and facilities planning. Because of the composition of the student population, and the numbers of Meadowbrook students involved, control-group testing was not used. On the Local Environmental Education Cognitive Exam, the students exceeded the .001 level of significance by increasing knowledge pre-post substantially (see Table VI). The students also performed well in mastering pre-selected, unmastered competencies (see Table VII). However, the affective measures, including Anecdotal Records, Ryan-Seidel Observation Scales and school-community involvement surveys, revealed important student growth in attitudes concerning environmental problems and issues. On the Ryan Scale (7 point Semantic Differential), the student achieved mean ratings of 5.33, 4.83, 5.27 and 5.00 on exhibiting alert, responsible, confident and independent behaviors, respectively. On the Seidel Scale, the LAP teachers scored a mean rating of 4.10 on a five-point scale for sixteen data points including organization for learning, enthusiasm, cooperation with students and freedom to discuss.

A total of sixteen critical incidents was reported indicating positive behaviors by students toward environmental concerns. Finally, through LAP activities, the students became more involved in other school activities and community activities dealing with environmental issues according to evaluator's interviews with students.

ASSOCIATED RESEARCH

Appendix E, KARE in the Literature, contains fifty selected citations and references to Project KARE, the LAPs, and the Action Workshops.

APPENDICES

A. ACRONYM GLOSSARY

B. KARE MILESTONES, 1971-76

C. EVALUATION EVIDENCE, 1971-76

D. EVALUATIVE DATA

E. KARE IN THE LITERATURE, 1971-76

APPENDIX A

ACRONYM GLOSSARY

A/A	Adopter/Adapter
BCR&D	Bernard Cohen Research and Development
D/D	Developer/Demonstrator
DHEW	Department of Health, Education and Welfare
EE	Environmental Education
EERC	Environmental Education Resource Center
ERANDA	Educational Research and Development Associates
ESCS	Environmental Studies Consultant Services
ESEA	Elementary and Secondary Education Act
IEE	Institute for Environmental Education
JDRP	Joint Dissemination Review Panel
KARE	Knowledgeable Action to Restore Our Environment
LAPs	Local Action Programs
NDN	National Diffusion Network
NIE	National Institute for Education
PDE	Pennsylvania Department of Education
PDP	Pennsylvania Diffusion Plan
SF	State Facilitator
USOE	United States Office of Education

APPENDIX B

KARE MILESTONES 1971-76

Date	Event
Fall, 1970	Intermediate Unit Representatives devise plans for regional environmental education project.
July, 1971	Project CARE (Cooperative Action to Restore Our Environment) funded by USOE under ESEA, Title III, Section 306.
January, 1972	First group of 17 Local Action Programs commence activities.
February, 1972	CARE changed to KARE (Knowledgeable Action to Restore Our Environment).
July, 1972	Project KARE receives grant from the Office of Environmental Education under P.L. 91-516 to produce series of curriculum activities guides.
October, 1972	Group of 20 additional Local Action Programs is established.
July, 1973	Activities guides are submitted to the Institute for Environmental Education (IEE).
December, 1973	Since July, Project KARE functions with reduced staffing due to Presidential impounding of funds. With release of monies, 22 Local Action Programs and 17 Special Projects are conducted.
October, 1974	Establishment of 17 Local Action Programs and 8 Special Projects.
May, 1975	Project KARE approved unanimously for nationwide diffusion by the Joint Dissemination Review Panel of USOE/NIE.
June, 1975	Project KARE Nationally Validated in IV-D process by three-member panel appointed by USOE/PDE.
July, 1975	Funds provided by USOE under Title III, Section 306, to initiate dissemination activities in NDN.
January, 1976	PDE funds Statewide dissemination activities of Project KARE as a Developer/Demonstrator Project.

May, 1976	Project KARE approved as one of 20 projects in Pennsylvania Diffusion Plan. Can serve Adopter/Adapter schools.
October, 1976	Training workshops conducted for six Adopter/Adapter schools. Funded under ESEA Title IV-C by PDE.
October, 1976	Receipt of grant under ESEA, Title IV-C from PDE to coordinate Project E3 (Energy, Economics and Environment).

APPENDIX C

EVALUATION EVIDENCE 1971-1976

1971-72 REPORTS

1. *Project CARE* Performance Objectives*, Local and Central, Project CARE, Blue Bell, PA, 1971 (14 pp.).
2. *Pre-Audit Report of Project CARE*, Dunlop and Associates, Darien, CT, October 1, 1971 (21 pp.).
3. *Pre-Evaluation Report of the Five-County Regional Environmental Project CARE*, ERANDA, Downingtown, PA, October 15, 1971 (15 pp.).
4. *Implementation Audit Report of Project CARE, and Addendum (March 1, 1972)*, BCR&D, Spring Valley, NY, February 15, 1972 (27 pp.).
5. *Interim Evaluation Report on the Five-County Environmental Education Project KARE*, ERANDA, West Chester, PA, May 5, 1972 (71 pp.).
6. *Interim Audit Report of Project KARE*, BCR&D, Spring Valley, NY, May 25, 1972 (21 pp.).
7. *Final Evaluation Report on the Five-County Environmental Education Project KARE*, ERANDA, West Chester, PA, August 15, 1972 (211 pp.).
8. *Final Audit Report of the 71-72 of Project KARE*, BCR&D, Spring Valley, NY, September, 1972 (14 pp.).
9. *Sketches of Local Action Programs for School Environmental Education*, Project KARE, Blue Bell, PA, Spring, 1972 (19 pp.).
10. *Final Reports of Local Action Programs*, Project KARE, Blue Bell, PA, Spring, 1972 (24 pp.).
11. *Annual Report, FY'72*, Project KARE, Blue Bell, PA, Summer, 1972 (43 pp.).

1972-1973 REPORTS

12. *Revised Evaluation Design for FY'73*, Project KARE, Blue Bell, PA, May, 1972 (76 pp.).
13. *Pre-Audit of the Design to Evaluate the 1972-73 KARE Program*, BCR&D, Spring Valley, NY, October, 1972 (14 pp.).
14. *Implementation Report, Five-County Environmental Education Project KARE*, 1972-73, ERANDA, West Chester, PA, November 15, 1972 (20 pp.).

*NOTE: Originally CARE, changed to KARE during early 1972.

15. Implementation Audit Report, Five-County Environmental Education Project KARE, BCR&D, Spring Valley, NY, January, 1973 (26 pp.).

16. Interim Evaluation Report of the Five-County Environmental Education Project KARE, 1972-73, ERANDA, West Chester, PA, March, 1973 (65 pp.).

17. Interim Audit Report of Project KARE, BCR&D, New City, NY, April, 1973 (47 pp.).

18. Final Evaluation Report of the Five-County Environmental Education Project KARE, ERANDA, West Chester, PA, July 15, 1973 (160 pp.).

19. Final Audit Report of the Five - County Environmental Education Project, Project KARE, BCR&D, New City, NY, August, 1973 (31 pp.).

20. Sketches of Local Action Programs for School Environmental Education, Project KARE, Blue Bell, PA, Spring, 1973 (22 pp.).

21. Final Reports of Local Action Programs, Project KARE, Blue Bell, PA, Summer, 1973 (20 pp.).

22. Summary Report of Evaluation Activities of Project KARE, 1972-1973, ERANDA, West Chester, PA, October 17, 1973 (15 pp.).

1973-74 REPORTS

23. Revised Evaluation Design for FY'74, Project KARE, Blue Bell, PA, December, 1973 (50 pp.).

24. Pre-Audit Report of the 73-74 Project KARE, BCR&D, New City, NY, January, 1974 (27 pp.).

25. Implementation Report, Five-County Environmental Education, Project KARE, 1973-74, ERANDA, West Chester, PA, January 15, 1974 (17 pp.).

26. Implementation Audit Report of Project KARE, BCR&D, New City, NY, February, 1974 (26 pp.).

27. Interim Evaluation Report of the Five-County Environmental Education Project KARE, 1973-74, ERANDA, West Chester, PA, April 30, 1974 (45 pp.).

28. Interim Audit Report of Project KARE, BCR&D, New City, NY, June, 1974 (33 pp.).

29. Final Evaluation Report of the Five-County Environmental Education Project KARE, 1973-74, ERANDA, West Chester, PA, July 15, 1974 (138 pp.).

30. Final Audit Report of the Montgomery County Intermediate Unit Project KARE, 1973-74, BCR&D, New City, NY, September, 1974 (36 pp.).

31. *Sketches of Local Action Programs for School Environmental Studies*, Project KARE, Blue Bell, PA, Spring, 1974 (25 pp.).

32. *Final Reports of Local Action Programs, 1973-74*, Project KARE, Blue Bell, PA, Summer, 1974 (25 pp.).

33. *Summary of the Final Report of the Five-County Environmental Education Project KARE, 1973-74,* ERANDA, Westchester, PA, October, 1974 (7 pp.).

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TABLE I

1973-74

Degree* to Which Local Action Programs Met Instructional Performance Objectives

*Key

++ Attained or exceeded criterion
+ Partially attained criterion
0 Criterion not achieved

** Objectives: Affective Domain

1a Positive attitude toward environment
1b Observed behaviors
1c School-related activities
1D Community activities

***Objectives: Cognitive Domain

2a Competencies/skills
2b Local cognitive examination

Local Action Program	Affective Domain**				Cognitive Domain***	
	1a	1b	1c	1d	2a	2b
1. DARE	++	++	++	++	++	++
2. KARE for Kensington	++	++	++	++	+	++
3. Operation Cemetary	++	++	++	++	++	++
4. Prince Hall PRIDE	++	++	++	++	+	++
5. Project CAHOOTS	++	++	++	++	+	++
6. LISTEN	++	++	++	++	++	++
7. Green Bridge	++	++	++	++	++	++
8. ESAN	++	++	++	++	++	++
9. LAW	++	++	++	++	+	0
10. Air Watchers	++	++	++	++	++	++
11. The Choice is Yours	++	++	++	++	++	++
12. E-LAB	++	++	++	++	0	++
13. KAREBROOK	++	++	++	++	+	++
14. Open Space	++	++	++	++	+	++
15. Project Dynamic	++	++	++	++	+	++
16. EAP	++	++	++	0	+	++
17. BKEP	++	++	++	0	++	++
18. CRISIS	++	++	++	0	+	++
19. ISWS	++	++	++	++	++	++
20. SCRAP	++	++	++	++	+	+
21. GEEP	++	++	++	++	++	++
22. O-PROBE	++	++	++	++	++	++

TABLE II

Analysis of 1973-74 LAP Student Scores on Local EE Cognitive Exams

Local Action Program	N	Max.	Pre-Mean	Post-Mean	Change	t	Probability
DARE	30	25	15.7	16.7	1.00	2.21	<.025
KARE for Kensington	24	25	4.21	20.92	16.71	28.86	<.01
Operation Cemetery	70	25	9.9	18.93	9.03	49.31	<.001
Prince Hall PRIDE	20	25	16.85	21.85	5.0	4.76	<.01
Project CAHOOTS	26	25	17.27	18.65	1.38	5.09	<.001
Project LISTEN	96	25	10.98	19.33	8.35	25.25	<.01
Green Bridge	28	25	10.86	17.0	6.14	7.70	<.001
ESAN	35	25	10.34	22.23	2.89	9.10	<.01
Air Watchers	8	25	18.5	23.13	4.63	4.26	<.01
The Choice is Yours	18	25	21	24.11	3.11	3.65	<.01
E-LAB K	44	25	9.23	10.05	.82	3.24	<.01
1-2-3	80	25	20.10	23.59	3.49	8.94	<.01
4-5	56	25	10.91	18.66	7.75	9.97	<.01
KAREBROOK	32	25	8.44	18.09	9.65	18.89	<.001
Open Spaces 5	24	25	17.08	18.67	1.59	2.25	<.05
6	25	25	16.4	18.28	1.88	2.50	<.01
7	48	25	20.31	21.42	1.11	3.14	<.01
Project Dynamic	17	25	12.88	15.71	2.83	2.75	<.01
BKEP	11	25	18.73	21.73	3.00	5.24	<.01
CRISIS	10	25	10.06	15.90	5.84	4.86	<.01
ISWS (Great Valley)	20	25	11.55	15.55	4.0	6.05	<.01
(Conestoga HS)	14	25	14.43	17.43	3.0	4.27	<.01
SCRAP	17	25	21.05	21.65	.60	.77	NS
GEEP	25	25	15.24	17.2	1.96	3.13	<.01
O-PROBE	77	25	18.58	19.35	.77	2.52	<.01

TABLE III

Change in Attitude from Pre to Post Test of Operation Adoption Target Students in Action and Traditional Settings

Group	N	Pre Mean	Post Mean	Change	t	Probability
Action	27	2.72	3.60	.88	9.99	<.001
Traditional	27	2.66	3.46	.80	8.84	<.001

TABLE IV

Comparison of Action and Traditional Operation Adoption Student with Control Group on Improvement in Attitude

	N	Pre Mean	Post Mean	Adjusted Mean	F-Ratio	Probability
Action	27	2.72	3.60	3.69	10.31	<.01
Traditional	27	2.66	3.46	3.56		
Control	50	3.32	3.27	3.17		

TABLE V

Comparison of Operation Adoption Action, Traditional, and Control Group on Improvement in General Knowledge

	N	Pre Mean	Post Mean	Adjusted Mean	F-Ratio	Probability
Action	29	12.97	15.76	15.12	12.21	<.01
Traditional	29	10.92	11.23	11.40		
Control	49	10.63	12.92	13.21		

TABLE VI

Operation Adoption--Student Scores on School Morale Scale

	Pre-Mean	Post-Mean	Adjusted Mean	F-Ratio
Total Test:				
Action	.41	.73	.74	217.206
Traditional	.39	.47	.47	-----
School Plant:				
Action	.38	.71	.70	64.8
Traditional	.33	.41	.42	-----
Student-Teacher Relationship:				
Action	.34	.68	.69	47.19
Traditional	.36	.45	.45	-----
General School Morale:				
Action	.50	.83	.82	50.89
Traditional	.42	.55	.55	-----
Other Students:				
Action	.50	.75	.75	50.89
Traditional	.49	.50	.50	-----
Community:				
Action	.37	.75	.75	50.07
Traditional	.35	.48	.48	-----
Administration and Regulations:				
Action:	.49	.74	.75	55.54
Traditional	.53	.51	.50	-----
Instruction:				
Action	.38	.73	.74	51.27
Traditional	.40	.45	.45	-----

NOTE:
1. Degrees of Freedom are 1 and 57
2. Level of Significance is .01
3. The F-ratio must be 7.31 in determining significance (Roscoe, 1969)

TABLE VII

Change in Performance of KAREBROOK LAP Students on Locally Constructed Test of Environmental Knowledge

N	Max.	Pre-Mean	Post-Mean	Change	t	Probability
32	25	8.44	18.09	9.65	18.89	<.001

TABLE VIII

Mean Student Rating* by KAREBROOK LAP Leader on Project Established Competencies**

This student can:	N	$\bar{X}$
1. Plan activity with township officials	28	3.18
2. Identify existing trees at KAREBROOK	29	4.07
3. Label existing trees at KAREBROOK	26	4.19
4. Identify wild flowers at KAREBROOK	27	3.70
5. Survey a stream	31	4.10
6. Record information about a stream	22	4.27
7. Make a map	6	4.83
8. Read a topographic map	25	3.72
9. Test water using a Millipore procedure	32	4.28
10. Test air using a Millipore procedure	31	3.26
11. Describe organization of local government	28	3.36
12. Work with senior citizens	12	3.67
13. Submit publicity to local media	27	3.22
14. Use library for flora and fauna identification	23	3.09
15. Develop a newsletter	20	3.70
16. Do microbiological studies	30	3.70
17. Do macrobiological studies	32	3.78
18. Identify animals in KAREBROOK, their habitat and methods of living	31	4.19
19. Identify birds in KAREBROOK, their habitat and methods of living	29	3.72
20. Test soil using the LaMott procedure	30	3.37
21. Plan a parking lot	17	3.76
22. Plan and build a bridge	16	3.75
23. Plan and construct a trail	11	4.27
24. Construct bird feeders	3	4.67
25. Make a graph, interpret and evaluate results	18	3.89

*Rating: 5 excellent; 4 good; 3 fair; 2 poor; 1 very poor

**All competencies were rated after eliminating students who had already mastered competencies.

APPENDIX E

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Note: The above citations, and references concerning KARE, were selected from among nearly 900 published since 1971.

DEVELOPMENT OF THE TENNESSEE VALLEY AUTHORITY'S ENVIRONMENTAL EDUCATION PROGRAM

by Lynn M. Hodges*

Federal, state, regional, and local bureaus of conservation, environmental protection, and land management traditionally have recognized what they typically call the information-and-education (I&E) function, and today are giving it renewed emphasis, not only to explain regularly to the public how they are spending public funds but also to set before the public an agenda for environmental action. To foster or keep pace with the environmental movement, the resource management agencies have broadened their education efforts in both scope and depth. Whereas yesterday their public messages were aimed primarily at boosting the particular roles of the various bureaus, today there is a growing acceptance of the interdependency of all conservation problems and programs, and a recognition of the compelling need for broad public understanding of the interdependency.

At the Washington level, the Forest, Park, and Soil Conservation Services have taken the lead in formal environmental education. The various media and methods of education employed by the USFS today have been called "models of the art." The NPS embraces an array of environmental education efforts built around "specially developed teaching materials and experiences." The SCS has utilized admirably its own built-in grass roots educational arm, the local Soil Conservation District. Particularly through its regional monthly newsletters, the newer Environmental Protection Agency has added an important air of currency to environmental education materials. And, the annual reports of the President's Council on Environmental Quality have become essential textbooks on college campuses.

But the federal resource management agency with perhaps the most ambidextrous yet cohesive environmental education program today is the Tennessee Valley Authority (TVA). From its very inception in 1933, TVA had what might be called an ecological orientation, and its modern EE activities reflect this inexorable relationship of man and land.

INTRODUCTION

The Tennessee Valley Authority (TVA) is a Federal agency charged with the responsibility of managing and developing both human and natural resources

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in the Tennessee River Valley. Within the ranks of Federal agencies, TVA is unique. Officially formed in 1933, the beginning of the TVA concept was fostered in the political and environmental realms of the Theodore Roosevelt administration at the turn of the century:

> "It was the logical outcome of a long ferment of American thinking about the Nation's resources and how to conserve and develop them.
>
> "Three hundred years of American settlement had been wasteful; resources were regarded as practically inexhaustible. President Theodore Roosevelt sparked the trend that led to the reversal of wastefulness. Gifford Pinchot, chief U.S. Forester and W J "No Stop" McGee, anthropologist, geologist, and hydrologist, headed his conservation team...
>
> "Pinchot considered that his own specialty, forestry, was inseparably related to other natural resources—to streams and inland navigation, waterpower and flood control, soil and erosion, minerals, fish and game. He came up with a capsule idea that was expressed practically in the TVA Act many years later. All these, he concluded, were not separate problems; they "make up the one great central problem of the use of the earth for the good of man."

On May 18, 1933, President Franklin D. Roosevelt signed the TVA Act, formalizing an agency to examine a multitude of resources as interrelated factors, to develop these resources with the thesis that the human and natural environments are inseparable, and to function on a regional basis. The focus of this effort was to be in parts of seven states encompassed by the Tennessee River Valley (Figure 1).

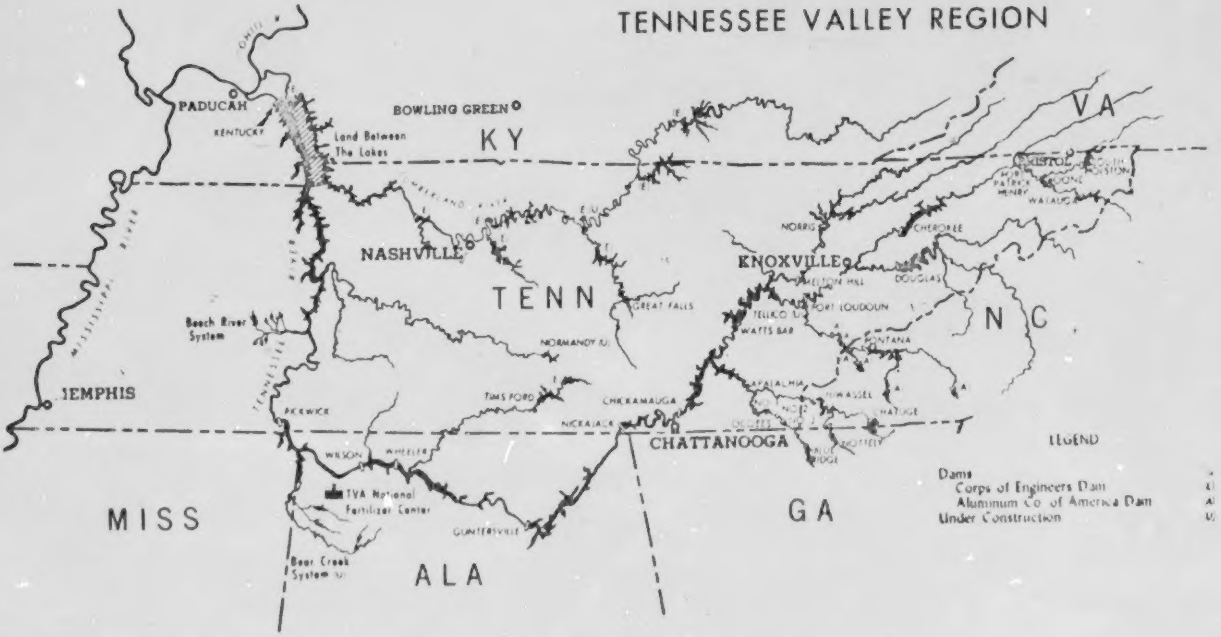
TENNESSEE VALLEY REGION
OHIO
PADUCAH
KENTUCKY
BOWLING GREEN
Land Between The Lakes
KY
VA
BRISTOL
SOUTH HOLSTON
FORT PATRICK HENRY
BOONE
WATAUGA
NORRIS
CHEROKEE
NASHVILLE
KNOXVILLE
MELTON HILL
DOUGLAS
TENN
GREAT FALLS
TELLICO
FORT LOUDOUN
WATTS BAR
N C
FONTANA
Beech River System
NORMANDY
TIMS FORD
APALACHIA
HIWASSEE
MEMPHIS
PICKWICK
CHICKAMAUGA
NICKAJACK
CHATUGE
OCOEE
NOTTELY
CHATTANOOGA
BLUE RIDGE
WILSON
WHEELER
TVA National Fertilizer Center
GUNTERSVILLE
MISS
GA
ALA
Bear Creek System
MISSISSIPPI RIVER
TENNESSEE RIVER
LEGEND
Dams
Corps of Engineers Dam
Aluminum Co. of America Dam
Under Construction

Figure 1

With its birthright founded in a strong concern for the environment and the relation of man to and in that environment, with its existent multidisciplinary structure, and with its focus on a major region of the nation, the Tennessee Valley Authority (TVA) identified the need for a broad-based educational program to promote and support these ideals. Environmental education, thus, evolved as a major program.

PURPOSE

The environmental education program of TVA seeks to share the expertise of staff in the development and implementation of local, state, and regional environmental education programs, and through such involvement, provides a model for regional development throughout the nation. TVA serves as a supportive resource to environmental education programs through provision of staff expertise, facility development, and selected demonstration activities throughout the Tennessee Valley.

The need for environmental education in the Tennessee Valley is representative of that of the rest of the nation. In an effort to provide the most needed supportive services, TVA has closely aligned its efforts with the state departments having responsibility for the development of environmental education in the seven states of the Valley. With the full realization that no single agency or entity can provide total input or support for implementation of environmental education, TVA has chosen to provide selected inputs into both formal and nonformal efforts.

Broad program objectives of the Tennessee Valley Authority in environmental education are to:

1. Improve the quality of life, the environment, and environmentally oriented education in the Tennessee Valley Region.
2. Assist in the development of attitudes, values, and lifestyles which are inherent in a quality environment.
3. Provide learning experiences which directly involve people in identifying and solving real community environmental problems.
4. Assist in the development of a citizenry that has a basic understanding of man's relation and interaction with the total environment; understands the need for maintaining ecological balance; is aware, concerned, and motivated to work on solutions to environmental problems; and is individually committed to improving the environment.
5. Provide information about the environment and its associated problems to the citizenry so they can make the best possible decisions on the utilization of resources.

To implement these objectives, both formal and nonformal programming are necessary. Essentially the formal programs are targeted toward the elementary, secondary, and higher education entities. The nonformal programs are those in which individuals participate within their own discretionary time frames.

To further expand upon the objectives, TVA has made some basic assumptions underlying its approach to environmental education:

1. Environmental education includes both formal and nonformal education.
2. Environmental education is a process-oriented approach, and is aimed at assisting the learner in becoming informed and in learning how to be effective in solving and preventing the full range of environmental problems.
3. Environmental education is interdisciplinary in approach.
4. Environmental education is aimed at motivating the individual to act upon his environmental concerns.
5. Environmental education is concerned about the social implications of environmental decisions.
6. Environmental education is directed toward helping individuals become knowledgeable concerning the total environment (natural and man-made) and associated problems (physical, social, economic, political, and cultural).
7. Environmental education is directed toward increasing the learner's interest in, awareness of, and sensitivity toward the environment.

The preceding delineation serves as a functional framework for environmental education as implemented by TVA. For more formal purposes, TVA endorses and utilizes the definition developed under the auspices of the U.S. Office of Education, Department of Health, Education and Welfare, as expressed in the Environmental Education Act:

> "Environmental education is the educational process dealing with man's relationship with his natural and man-made surroundings, and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment."

FUNDING SOURCE

As a Federal agency, TVA receives Congressionally-appropriated funds. It is primarily through these funds that TVA's environmental education program is operated. Other funding is received from utilization of TVA environmental education facilities. Such funding, however, merely helps offset maintenance and operational expenses of the facilities.

TARGET AUDIENCES

Primary targets for TVA's environmental education program are the individuals residing in the Tennessee Valley region. However, since one purpose is to provide exemplary programs for the nation, TVA services are broad-ranging and are not restricted to any one geographical area. Selected inputs of TVA into the development of programs depend upon the type of program, formal or nonformal.

1. Within the formal education program, TVA needs to:

    a. Provide professional assistance, consisting of technical information, leadership, and continuing liaison to bring about a self-sufficient program for the sponsoring entity.

    b. Provide facility development assistance to schools and organizations in the development of outdoor and indoor facilities for environmental education.

    c. Provide needs assessment assistance to local schools and organizations in assessing environmental concerns preparatory to program development.

    d. Provide site analysis assistance to schools in analyzing potential sites for outdoor classrooms, laboratories, trails, and study sites, based on the feasibility of the site, suggested uses, and long-range utilization.

    e. Provide assistance in identifying and obtaining materials for material resource centers on local and regional levels, and specific materials suitable for classroom use.

    f. Provide assistance with in-service programs designed to instruct teachers in the techniques and philosophy of environmental education, including such activities as problem-solving seminars, instrumentation workshops, field activities and orientation, role simulation sessions, and environmental awareness programs.

    g. Provide continuing education assistance to environmental education centers and universities in the development and implementation of course work for teachers in environmental education.

2. Within the nonformal education program, TVA seeks to:

   a. Provide assistance with adult and continuing education through cooperative efforts with colleges and universities in program design and implementation.

   b. Participate in cooperative programming with local, state, and Federal organizations, service and civic groups, and the private sector to produce programming and materials for the nonformal entities.

   c. Participate in or develop community education seminars relating to educational and environmental concerns on the local level.

   d. Develop TVA land and facilities for access and use by the public as participants in nonformal environmental education activities.

Although the preceding are the major areas of emphasis, special demonstrations designed to identify and test innovative techniques and processes are also frequently supported by TVA's environmental education effort.

DETAILED HISTORY

Since the formalization of the agency in 1933, TVA has faced the challenge of educating the citizenry of the Tennessee Valley. Early themes were natural-resource-related. Common topics included the use of natural resources, the management of basic land and water units, and the conservation practices necessary to insure continuation of the resource pool. The early techniques were general in nature and used such channels as agricultural extension agents, employee training programs, and libraries for the areas in which employees worked. Although all of these programs were directed toward environmental and conservation objectives, it was not until the early sixties that TVA initiated the programs that were eventually to grow into the current environmental education effort. The first major step was the initiation of a major TVA project, Land Between The Lakes.

> "The Tennessee Valley Authority's Land Between The Lakes project is potentially the most significant single development in the field of outdoor recreation and education that has happened in this century . . . ."

The optimism expressed by Dr. Milton Gabrielsen of New York University in this statement is characteristic of the enthusiasm associated with the initiation of TVA's Land Between The Lakes.

> The idea originated with TVA in 1959 while the U.S. Army Corps of Engineers was building Barkley Dam on the Cumberland River. For a distance of 40 miles, two great river

> valleys—the Tennessee and the Cumberland—were separated only by a low divide. In 1944, TVA had filled one of the valleys with the waters of Kentucky Lake. Barkley Lake would fill the opposite valley, leaving only a narrow, largely wooded and sparsely settled strip, between two massive man-made lakes. Together, the lakes would give new qualities to this unproductive strip. Under appropriate management, wildlife could abound within its boundaries and fish in the surrounding waters. Isolated coves and inlets along its 300 miles of shoreline would provide space for thousands of campsites to serve the millions of Americans looking to Federal lands for relief from the pressing demands of an industrializing society. The acquisition and restorations of the area's resources could provide valuable lessons in conservation education.

Executive approval from President John F. Kennedy in June 1963, and the subsequent Congressional endorsement through the Public Works Appropriations Act of 1964, initiated the national demonstration. The two major themes and areas of demonstration were to be outdoor recreation and environmental education.

One of the earliest construction projects at the Land Between The Lakes was the Youth Activity Station, a residential facility for environmental education. The complex was constructed to accommodate approximately 75 individuals in six dormitory-type cabins. A main dining and assembly hall was built, and an activity building with sinks, work areas, and storage space rounded out the educational complex. Completed in the spring of 1966, the purpose of the Youth Activity Station was to provide residential facilities for formal educational groups studying environmental and conservation concepts, and to provide a broad range of activity areas for such study. Prior to completion of the Youth Station facility, TVA hired its first environmental educator. Initial duties were to establish the Youth Station as a main focal point for residential environmental education programs, to identify and develop the educational resources of the 5000-acre tract designated as the Conservation Education Center, and to identify additional staff to assist with these projects. In accomplishing these early tasks, TVA found that several patterns emerged as precedents directly affecting its future activities in environmental education.

An early major decision concerned user groups. What groups would most appropriately be identified as targets to be approached and encouraged to use the facilities? The usual tendency, to place priority on quantity (to fill the facility), rather than quality (to maximize use through careful selection), was present. However, recognition that such action is difficult to correct once instituted resulted in the wise decision to limit use of this facility to formal education groups. Most of these were viewed as public school groups seeking residential experience in environmental education. Groups other than formal education groups, or formal education groups with other interests, were directed where possible to other and more appropriate facilities or accommodations.

This decision proved to be a major factor in the success of the program. The facility thereby gained a reputation as a center for educational activities. This provided a sound basis for working with school administrators who might have envisioned the project as primarily recreational; an area interesting to visit, but of no real educational value. The most skeptical administrators, when visiting the facility, were convinced of its educational merit. They were able to see the motivative influence of the facilities and to witness the learning processes.

A second precedent was set with respect to the use of staff as field teachers for the students in residence at the Youth Station. TVA's role in environmental education is that of a supportive resource to the educational communities. It is not the purpose to replace the educational function of the schools. TVA staff consequently focused its attention on assisting the educator, the teacher, in preparing to conduct the activities. To remove the teaching role from the teacher would be to assign to him a role of spectator and thereby to lose valuable insight into individual student needs, and to lessen the chances of follow-up activities back in the classroom. As a result, TVA staff did not work directly with the students while in residence.

The assumption of responsibility for program by the systems tended to make the residential program a more formal part of the school curriculum. As opposed to an added field trip or outing, the residential experience became an essential element in the instructional processes, and frequently became an annual or semi-annual occurrence with many groups. The success of such programs prompted several groups to move into more formalized activities. The development of system-wide curriculum guides, intra-system training programs for teachers by other teachers, and involvement of high school youth with younger children in residence, are examples. The success of this approach, as opposed to TVA's providing a predetermined curriculum guide or field instruction by staff, is evidenced by the steady use of the facilities and the voiced approval of this method by the educational community. This concept of TVA providing assistance to teachers with programming rather than directly teaching the students has been maintained as TVA policy.

As use increased at the residential facility, other facilities in the Conservation Education Center were planned and implemented. Center Station, originally an information and office structure, was renovated for use as a major interpretive center. In August 1967 the restoration and construction of an observation platform overlooking the Youth Station and Lake Barkley atop an abandoned silo was formally dedicated as Silo Overlook. In February 1969 Empire Farm, a major educational facility, was completed. The farm complex consisted of the farmhouse, which contained tools, artifacts, and farm equipment from earlier times, several barns housing the typical farm animals, and other outbuildings for large farm equipment, both old and new. It was designed to give students exposure to several farm practices. Close contact with the animals allows visitors and students to examine the specialized characteristics and benefits of the domesticated species.

An extensive trail system was built throughout the 5000-acre Conservation Education Center. The trails, like the facilities, were designed to be both demonstrative and functional and ranged from paved surfaces for the handicapped to longer, primitive hiking trails to special audio trails that have recorded interpretive messages. By the late 1960's the major facilities within the Conservation Education Center were completed, and the name of the area was changed to the Environmental Education Center.

With the focal point of activity in the Environmental Education Center firmly established, the scope of environmental education expanded to include numerous other areas, both inside and outside of Land Between The Lakes. The expansion of the environmental education program established contacts with several groups and land bases beyond the boundaries of Land Between The Lakes. Initially assistance was confined to establishment of outdoor laboratories and school sites for environmental education. Gradually, the scope of the activities increased to include cooperative programs and projects with school systems and civic groups in all seven states of the Tennessee Valley. Contacts and programming with state departments of education and Federal agencies were major achievements during this period.

In September 1969 TVA and the thirteen northwest Alabama school systems began to establish the concept of a regional educational consortium for environmental education. The result emerged early in 1972, and as described to TVA's Board of Directors, "The purpose of the project is to introduce environmental education programming into the schools in the Bear Creek watershed, with professional leadership experienced in program planning and development." TVA provided financial assistance for the first sixteen months. Assistance from TVA staff also included initial organization and identification of qualified staff. Additional and subsequent funding was provided by the participating systems based on a fee per pupil and standard cost for membership. Although not all of the original thirteen school systems were to continue within the consortium, the majority continued programming with local funds. Additional funding was successfully solicited through the Environmental Education Act (P.L. 91-516) and local sources. The Bear Creek watershed is currently operative and has maintained the original staff. This early experiment with independent school systems organized into consortia for environmental education was to provide a successful model upon which TVA patterned one of its major program components.

Until the early 70's, TVA's environmental education program had been centered primarily in the Land Between The Lakes. With the national impact of the environmental education movement, more divisions within the TVA structure were becoming involved in environmental education activities. To eliminate duplications of efforts and to provide close coordination, a TVA Advisory Council for Environmental Education was formed. The membership consisted of division directors and staff with environmental education activities. This Advisory Council, which is still viable, reviewed the progress and assessed the need for additional program development on a periodic basis.

The decision was next made to establish a formal, Valley-wide environmental education program. This program was to be housed in a single division within TVA, but would maintain responsibilities for environmental education within all divisions. This unit was implemented in the fall of 1974, housed in the Division of Forestry, Fisheries and Wildlife Development in Norris, Tennessee. In addition to the staff of the new unit, existent staff was maintained at specific program sites, such as Land Between The Lakes.

From the Valley-wide perspective of environmental education, two major program components evolved. One component, the Regional Environmental Education Development Project, would focus on the establishment of regional consortia and on programs with formal educational groups. The second component, the Regional Environmental Interpretive Development Project, would focus on the nonformal programming aspects of environmental education.

The Regional Environmental Education Development project was designed to systematically develop a network of environmental education consortia through the Tennessee Valley Region. Ultimately, this project will generate 12 to 15 consortia that will collectively span the Valley. The geographical objective is to have at least one consortium within 50 miles of any Valley resident. National demonstration of the effectiveness of such an implementation process is also an objective. The general method of implementation will follow the pattern of the Bear Creek watershed consortium.

In designated areas, superintendents of the school systems agree to the implementation of environmental education on a high priority basis. A description of the major program activities, plan for implementation, and plan for establishment of a self-sustaining consortium are prepared and presented to TVA. Once the plan is accepted, TVA and the consortium enter into a letter of agreement which delineates the assistance to be provided by TVA and the time frame for implementation of programs by the consortium. A full-time coordinator for environmental education is hired by the consortium to implement the designated programs. Common program thrusts are teacher-training programs, school site development activities, material and resource identification, and collection and curriculum development in environmental education. TVA's environmental education staff maintains liaison and provides supportive services to the consortium. TVA lands and facilities are also made available for use, and occasionally major construction or renovation of such facilities is made to accommodate the consortium's program. Currently the Regional Environmental Education Development project has generated a consortium in northwest Alabama, upper east Tennessee, southeast Tennessee, and west Kentucky. The remainder of the consortia will be implemented by 1985.

The Regional Environmental Interpretive Development project was designed to generate programs for the nonformal component of TVA's environmental education program. TVA lands and facilities are visited by millions of people annually. Programs for these individuals range from traditional natural and historical interpretive activities to development of major sites for nonformal use. Examples include the renovation of a 1908 powerhouse into an interpretive facility emphasizing energy use, generation, and conservation; a reproduction of an 1850 era farm complete with structures, crops and tenants; and extensive trail systems throughout public-use lands and designated Small Wild Areas managed by TVA. Whenever possible, such activities are developed in conjunction with the organized consortia, thereby allowing use by formal and nonformal groups.

The current status of environmental education within TVA is one of growth. Valley-wide plans for implementation are being well received and the established facilities, such as Land Between The Lakes, continue to grow in use and popularity. The status within the structural framework is unique. The environmental education unit is charged with responsibilities that cross divisional lines, allowing for widespread involvement and utilization of TVA staff and resources. It is a program that is fundamental to the edification of the Valley populace through a valid educational process. It is this validity that protects the integrity of the program, and prevents the environmental education effort from being interpreted as a public relations or propaganda ploy of a Federal agency. A quality program in environmental education will reflect favorably on the agency; however, this benefit is considered secondary to the benefits to the Valley populace. With the current level of activity and continued demonstrations of successful programming, the environmental education program of TVA will be assured of continued productivity.

EXTERNAL EVALUATION

The following evaluation is from Mr. Billy Shaw Blankenship. Mr. Blankenship is currently professor at Murray State University and is the director of the Murray State Center for Environmental Education. Prior positions include: State Consultant for Environmental Education-Kentucky Department of Education; Coordinator, ESEA Title III, Region VI-Project for Environmental Education; Professor, Eastern Kentucky University; Teacher, Madisonville Community College, Madisonville, Kentucky; and high school teacher in Lexington, Kentucky. Mr. Blankenship has had the opportunity to observe the development of TVA's environmental education program and responded to a request for an evaluation with the following:

> TVA's environmental education program has both strong and weak points from my perspective. Without a doubt the strongest of these is the approach taken by the Tennessee Valley Authority to develop both formal programs and programs for nonformal groups. Numerous Federal agencies have programs directed at either one or the other of these audiences; however, few have implemented the dual approach as effectively as has TVA.
>
> Within the realm of its formal programming, TVA has resisted the temptation to produce dogmatic products or "canned" programs. Their program effort has successfully been channeled toward assisting local groups meet local objectives based on the physical, cultural and economic resources available in those areas. The diversity of TVA's environmental education staff, as well as the expertise in other professional areas, provides a broad base of technical knowledge, especially in the natural

resource-related fields. There has been no attempt, however, to exclude expertise from other sources. To the contrary, involvement and interaction with other federal agencies, state organizations, and civic groups characterize TVA's approach. This mixing of resources results in a high degree of acceptance by the total community.

No program is without fault. The lack of widespread dissemination techniques and materials relating to their environmental education projects is a major deficiency in TVA's program. Too often, individuals seeking information about TVA's environmental education program are exposed to the environmental education facilities without understanding the programmatic efforts supporting those facilities. Many of TVA's projects would undoubtedly be seen as national examples for environmental education if they were given a higher degree of visibility. Improvement of TVA's dissemination and information sharing techniques is necessary to provide such visibility.

The final fault is by no means restricted to TVA, but is no less a problem. There is no evaluation of the program. To structure an evaluation of a program that is regionally defined by parts of seven states is not an easy task; however, it is one which must be met in order to provide TVA and the public information as to the degree of success current programs achieve and the need for continuation or redirection of these programs. As with the state of environmental education in general, this need for evaluation must be met as soon as possible.

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CONSERVATION AND ENVIRONMENTAL EDUCATION, MICHIGAN DEPARTMENT OF NATURAL RESOURCES

by Barbara Horn*

In a sense sportsmen and birdwatchers were the John the Baptists of the environmental movement. They were among the first to raise their voices against the mis-developments of America that were putting at hazard her fish and game. So state departments of natural resources came early on to practice a form of environmental education focused on wildlife conservation. In recent years the more enlightened departments have broadened their environmental education stance to impart the message that Homo sapiens may be the most endangered species of all. Traditionally among the leaders in conservation education has been the Michigan Department of Natural Resources. This report sketches the evolution of its environmental education efforts.

Environmental education has been defined as "the basic process leading toward the development of a citizenry that is aware of and concerned about the environment and its associated problems, and that has the knowledge, skill, motivation, and commitment to work toward solutions to current and projected problems" (from Michigan's Environmental Future, Governor's Environmental Education Task Force, 1973).

The environmental education objective of the Information and Education Division of the Michigan Department of Natural Resources is to serve as a catalyst in promoting this philosophy.

At one time, the Department of Natural Resources employed four education consultants, based regionally throughout the state. However, due to legislative mandate and budgetary constraints, there is currently only one Environmental Education Specialist within the Department of Natural Resources. Even with this limited manpower, it is felt that the Department of Natural Resources provides a significant impact in the field of environmental education in Michigan.

The Environmental Education News, a four-page publication with a ten-month circulation of 6700 is sent to all schools, private and public, universities, selected agencies and individuals, providing an up-date of current workshops, conferences, issues and materials to environmental education. E.E. News is considered a valuable tool by those who receive it, and requests are constantly received to be added to the mailing list. The last issue of each volume contains a tear-off, mail-back form which provides a type of evaluation of the newsletter, asking for comments and suggestions. These evaluations have been most positive and indicate that E.E. News is providing a needed service in Michigan as well as out-of-state.

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The division provides classroom and teacher materials upon request. Due to budgetary restraints, these publications are not sent in classroom quantity; however, teachers are permitted to duplicate the material. Included in this material are four booklets, providing activities and guidelines according to grade level. A number of educational centerfolds concerning ecology from the Department's magazine, Michigan Natural Resources, have also been reprinted for use in the classroom.

Consultant help is also provided in terms of curriculum development, school site development, outdoor education programs, and inservice training.

In cooperation with six universities, the unit coordinates, plans and helps to implement ten weeks of teacher environmental education courses held at the Ralph A. MacMullan Conservation School, a facility of the Department of Natural Resources. These summer sessions offer graduate and undergraduate credit, interchangeable among the cooperating universities. A common learning deals with the concept of the "Spaceship Earth" and its related problems, while each of the universities brings special emphasis to the course. Resource people, material, lectures, field trips, field investigations, hands-on activities and discussion groups focus on providing teachers with understanding of critical issues dealing with the relationship between man and his environment. An important facet of this program, which has been in existence since 1947, is that scholarships, paying room-and-board fees, are offered to teachers through garden clubs, sportsmen clubs, the Soil Conservation Districts, PTA's and industry. University tuition is the responsibility of the teacher. Department employees, representing a variety of divisions, attend these sessions as students as a part of their inservice training. This approach of "integrating" department personnel with teachers and youth leaders provides tremendous opportunities for sharing ideas, techniques and knowledge. Both groups find they have a great deal to learn and gain from each other.

In conjunction with the Teachers' Environmental School summer sessions, several February weekend "reunions" are offered to the summer alumni and their friends, thus providing continuity of the learning experience. A variety of mini-workshops and activities comprise the weekend schedule.

In July of 1967, the then-Michigan Conservation Commission approved a resolution whereby private landowners would be recognized by the Michigan Department of Natural Resources for making their lands available to schools or youth groups for environmental education purposes.

Currently, there are sixteen such Conservation Education Reserves, totaling 1744 acres. These voluntary offerings constitute a significant contribution to environmental education.

Throughout the years, there have been a number of diversified programs which were initiated, planned and implemented by the Education and Training Unit, many of which have had long-term effect.

In 1948, the Conservation and Education Committee was formed, acting in an advisory capacity on activities related to both Departments of Public Instruction and Conservation, functioning as a policy-forming body on conservation education problems and programs. During the committee's seventeen years of existence, special attention was given to the problem of writing useful curriculum materials for teachers. As a result, several publications were written, published and disseminated. Included in this effort were: Conservation Education in the Community School Program, A Guide for Teaching Conservation, Michigan's Natural Resources, and The Community School Site—A Laboratory for Learning. The committee conducted and participated in a variety of conferences and workshops and local conservation workshops for teachers.

One of the most significant endeavors in conservation education was the school camping program sponsored jointly by the Conservation Department and the Department of Public Instruction. Based on the belief that some learning can best be done in the out-of-doors, the initial experimental camp was held in 1948. The idea of outdoor education programs caught on rapidly and more and more schools became actively involved in these week-long camping experiences. The Education and Training Unit offered consultants to help plan and coordinate these sessions through its Regional Education Specialists. Today school camping is an integral part of the curriculum of many Michigan school districts.

During the late fifties and early sixties, interest developed in using the school site as an outdoor laboratory for learning. Here again the unit provided consultant services to schools in developing their sites, as an extension of the classroom. Not only did the consultants work on the planning of the site, but they also held workshops for teachers, training them in the use of the outdoor lab.

Also in the early sixties, through the promotional work of the Conservation Education Consultants and in cooperation with the Soil Conservation Service, County Extension Agents and Intermediate School Districts, County Field Days were held. These field day programs were planned to develop a greater understanding and awareness of conservation practices and resource management. As a result of the various lectures and field trips, many teachers later studied and toured many of their community sites with their classes.

Hunter safety programs were first initiated by the Education and Training Unit, through school assemblies conducted by the Regional Education Specialists. Today, the Department of Natural Resources Law Division coordinates a state-wide hunter safety program, as well as boating, snowmobiling and off-road-vehicle safety programs for youth.

In 1965-1966 the unit entered into a cooperative agreement with the Central Michigan Educational Resources Council whereby a teleclass, Michigan Conservation was produced, promoted, and transmitted as an educational television offering. The weekly, half-hour program was aimed at the upper elementary grade level.[1]

The Education and Training Unit works closely with Soil Conservation Districts, Departments of Education and Agriculture, County Extension, Sportsmen's Clubs, Women's Clubs, 4-H, Boy Scouts and Girl Scouts, and all school districts within the state providing consultant service and leadership in planning, promoting, and implementing conferences, workshops and inservice training.

In 1971-1973, staff consultation was given to the Governor's Task Force to write the State Environmental Education Plan, which was completed in 1973 and provided the framework, guidelines, and processes for coordinating and evaluating all environmental communication, education, and information activities in Michigan.

In 1974 the Department of Natural Resources was designated as both program agent and recruiting agent to work in cooperation with state and local agencies on the Youth Conservation Corps. YCC responsibilities include recruitment for both federal and non-federal projects, as well as coordinating the state and local projects.

Funding for carrying on the work of the Education and Training Unit comes from the state's General Fund. Occasionally, as in the Youth Conservation Corps program, the state is involved with federal proposals and matching money.

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[1] State of Michigan, Department of Conservation, Twenty-Third Biennial Report, 1965-1966, p. 124.

OFF-CAMPUS ACTIVITIES IN CALGARY, ALBERTA

by J. Reg Houghton*

The environmental movement has brought about the recrudescence of that special educational agency, the nature center. Various types of such centers are bringing a tangible view of spaceship earth to thousands of citizens around the country. Their message fills what otherwise would be a vacuum for the urban-bound. The National Audubon Society has recently put out a directory of 558 nature centers, up over 200 from 1969. For communities contemplating centers, the Society has a stunning set of guidebooks.

Nor is the outdoor education center concept confined to the United States. Over our northern border it has found its niche in Canada. This case study of Calgary's outdoor education program tells how, around a ranch nature center, has been built a series of activities that permeate school and community.

GENERAL DESCRIPTION OF THE COMMUNITY

Calgary, Alberta is a city of about 485,000 people located in the foothills near the Rocky Mountains and about 200 miles from the Canadian-American border.

The main economic base is founded on agriculture and mining. Very few large industries exist in the community.

Transportation has always been important to the city. Historically, the two rivers, Bow and Elbow, were main travel routes. Currently the city is served by the two major railways, Canadian Pacific and Canadian National. It is directly on the Trans-Canada Highway and most major airlines have offices and terminal space at the International Airport.

There are two school systems; the Separate (Catholic) with about 22,000 students and the Board of Education (Public) with about 85,000 students. There are also institutions of higher learning such as the Southern Alberta Institute of Technology, Mount Royal College and the University of Calgary.

From the point of view of design, the city is an example of urban sprawl. Calgary has the largest land area of any city in Canada.

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There are more automobiles per capita than any city in North America, including Los Angeles and comparable centers.

ENVIRONMENTAL/OUTDOOR EDUCATION

While outdoor education activities have been carried on by many particularly enthusiastic teachers over the years, at least part of the modern concept had its origin in the special experiment of Colonel Walker School in June of 1964. This experiment consisted of one class of elementary students participating in a week-long program at the site of Camp Kiwanis which was completely financed by school effort and by donations from interested individuals and groups. For the first time the Calgary Public School Board approved such an activity, but no financial assistance was offered. The project was deemed a success and was repeated in 1965, this time with a $500 contribution from the Board.

Strangely, nothing more happened until 1968 when a sub-committee of the Elementary Program Commission recommended the development of an Outdoor Laboratory School. That year a six-week program, a one-week experience for a total of 185 students, came into being. This was jointly financed by the School Board, a grant from the Provincial Government's Department of Youth, the Rotary Club and the Kiwanis Club. The effort was augmented by day-long trips for an additional 36 students.

This "committee coordination" continued, with the 1969 project expanded with 223 students in residence over a six-week interval, while 913 worked in the day-trip component. Sponsorship continued with the government grant shrinking and the Board increasing support to complete funding.

In 1970 the Outdoor 'Lab' School came under the Elementary Science Department and its supervisor, J. R. Houghton. For the first time a properly constituted Board budget came into being with very minor support grants from the Rotary Club and the Department of Youth. Nearly 360 students were in residence over a six-week interval with nearly 200 other Grade VI students in the day-trip program. In addition, another special-grant program permitted a further 300 students from the so-called Bowmont Community (culturally deprived) to participate during the fall term.

The 1971 program, Spring Interval, was the first totally funded by the School Board. The $10,000 budget supported 360 Grade VI students. The day-trip project loading stayed just about the same and the Bowmont Special Project of residential outdoor education served an additional 300 students.

An increase in budget to $12,000 in 1972 allowed the program to expand to include 480 Grade VI students over an eight-week period. The day-trip program grew to a participation level of 2500 children. Again, the Bowmont Project operated at budget of about $14,000.

Due to the fact that Mr. Houghton had taken on the title of supervisor of Science and Coordinator of Outdoor Education, the wide variety of school-independent "light-house" projects began to articulate and become formalized under his department. In 1973 the school system was reorganized on a Kindergarten to XII basis replacing the formal Elementary and Secondary Division which had existed for many years. The reorganization altered administrative positions and caused some new offices to be formed. A new department, Off-Campus Activities, was created and Mr. Houghton was named as its supervisor. The new department took over all outdoor education.

1973 saw an experiment whereby the Bowmont and the regular Grade VI Residence Programs were blended to form a 13-week project in the spring. A new site was selected--Kinsmen Camp Horizon, since Kamp Kiwanis was not winterized. Approximately 960 students, in toto, were accommodated. Nearly 4000 day-trip students were involved with participation from Grade I to VI.

1974 was a repetition of 1973 except there were 14 weeks of involvement with 1100 students. A staggering 5500 youngsters took part in day trips.

In 1975 a further 14 weeks of operation took place with virtually identical participation. However, Bowmont had withdrawn to another time period which meant an actual increase to 1400 students. Over 7000 students acted in the Day-Trip Program.

The Elementary Outdoor School Program approached maturity in the 1976 program which was run for a period of 20 weeks, from January to June. A new site, Silver Creek Ranch, was selected. A rotating professional staff of six was appointed. 1600 Grade VI students with 160 high school counsellors, 80 vocational food-services students and the 70 regular teachers, were served in the program at a budget cost of $147,000. The day-trip program, as such, ceased to exist. The Bowmont funding in this the final year allowed 360 students to engage in a modified program at the YMCA's Camp Yamnuska.

The planned 1977 program will see no growth except due to normal increases due to inflation. Current financial constraints have literally placed us in a "holding pattern" in the Elementary Outdoor School Program.

The previous statements demonstrate that the formal "thrust" of the Board of Education has been at the elementary level of the system. This is not to say that there have been no developments at the other levels. On the contrary, much has happened. For example, during 1975 the Department of Off-Campus Activities recorded over 210,000 student moves. (A move is a single student trip of one hour or longer, generally up to two weeks duration.)

This number was made up of:

(a) Kindergarten/Early Childhood visits;

(b) Great numbers of other elementary students;
(c) Junior High School (Grades VII to IX) -- tours including the Lifetime Activities Program; and,
(d) High school programs associated with biology, geology and physical education courses and including international travel related to Social Studies, Literature and Drama.

ENVIRONMENTAL EDUCATION -- RELATIONSHIPS

Over time, we have developed and maintained positive relationships with other institutions, agencies, and organizations. It has been both necessary and worthwhile for the Department of Off-Campus Activities to cultivate and strengthen such relationships. Among them are:

University of Calgary

Currently the largest number of teachers are found in the graduating classes from the Faculty of Education.

Their courses run to the conventional although occasional courses with an outdoor education focus are found in the Physical Education Faculty and the Curriculum and Instruction Department. A program of Environmental Design also has some content.

Our outdoor school is used for demonstration purposes and our people are often guest lecturers and resource personnel.

Mount Royal College

This institution provides transition classes to the university as well as terminal courses. Our main contacts are with the Departments of Recreation and Leisure Studies.

Civic Government

We have a close relationship with the City's Park and Recreation Division. We are able to use all park facilities at no cost and organized programs are also free and the Calgary Zoo and Botanical Gardens and the Historic Heritage Park. Reduced rates are extended at the Planetarium.

Provincial Government

In Canada, all education is the exclusive responsibility of the Province, with no Federal involvement. As a result, our system is controlled by the Department of Education in the provincial capital, Edmonton. The majority of educational funding originates there.

The situation in environmental education is made complex since relationships must be sorted out with other provincial departments such as Fish and Wildlife, Environment, Lands and Forests, and Culture, Youth and Recreation.

Some strides have been made. We are currently able to have exclusive use of five of the Forestry Department's Group Camps in the Bow-Crow Forest Reserve west of Calgary. Upper elementary, junior high and senior high schools are expected to make good use of these facilities. Also, a new Provincial Park, Fish Creek by name, has been developed within the southern confines of the city and we have booking and program rights for all weekdays.

Further, as a direct result of a Board motion, we are deeply involved in negotiations with provincial departments to conclude acquisition of land for the development of our own Outdoor Education Centres.

Other School Board Departments

Since Off-Campus Activities may be described as a "non-subject" subject, we work in close harmony with all subject and discipline areas. We attempt, for example, to assist teachers in all areas to translate classroom theory into three-dimensional practice. Drama classes attend plays; Music classes attend concerts; Food Services go to restaurants and other food outlets; Science classes to the zoo, game farms, parks and other field areas; Social Studies classes may visit Hutterite Colonies, Indian Reservations, historic sites, etc.; Physical Education groups engage in wilderness survival, skiing, horseback riding, etc.; Vocational Education and Industrial Arts groups may visit industries and offices and factories; —in other words, we try to reach as many children and teachers as we can.

Business and Industry

In order to provide the types of services to schools as stated immediately above, we have overtly reached out into the community to such major agencies as the Canadian Institute of Mining and Metallurgy, the Canadian Manufacturer's Association, the Alberta Dairyman's Association, and a number of public and private enterprises. These are, in 90% of all cases, supported by personal or telephone "selling-type" conversations. We are very pleased and enthusiastic with the responses we are getting.

The Media

We have managed to obtain rather good support from the press, radio and T.V. in our city. A full 30-minute colour TV "special" was prepared and aired by CFCN-TV. A number of features and items have appeared to the daily newspapers, The Albertan and The Herald.

EVALUATION

Program evaluation takes many forms in Calgary. In any project proposal, the presenter is expected to clearly outline the objectives and expected outcomes of the activity. If these are well-defined then measurement is a realistic possibility.

Parental input is viewed as essential since Board trustees are very sensitive to the feelings of the clients—the electorate. As a result we have paved the way by querying parents of students in our Elementary Outdoor School Program in order to validate our own "gut-feelings". We also feel the need for constant upgrading and development of the program by requesting teacher input.

Some years had elapsed since anything approaching an evaluation of the Elementary Outdoor School Program had taken place. As a result, a rather complacent attitude, supported only by a "gut-feeling" that the program is good, developed.

A 1976 evaluation summarized below, while not terribly scientific, does reflect the opinions and concerns of the participating teachers and, more importantly, of the parents. In both situations, the collatable data indicate support for the various dimensions of the program.

Certain topics or questions were directed only to the parents. These areas and the responses were:

1. The concept of outdoor education or off-campus activities was rated as GOOD, VERY GOOD or EXCELLENT by 98.2% of the respondents.

2. The concept of the Elementary Outdoor School as one way of carrying on outdoor education was rated as GOOD, VERY GOOD or EXCELLENT by 96.7% of the respondents.

(Note: We assumed that the fact of the participation of the schools and teachers was, by itself, an indication of support for the concepts.)

3. Opinions regarding vocational student cooks cannot really be considered valid. This question will not be included in future evaluations. Notwithstanding, it is refreshing and encouraging to note that this comment was rated as GOOD, VERY GOOD or EXCELLENT by 85.9% of the respondents.

4. We asked questions designed to retest opinions regarding the project and about its cost —

—Was the $20 cost fair?
98% of the respondents said it was.

—Would you pay more if necessary?
83.3% of the respondents would.

—Would you recommend it to friends or neighbors?
96.9% of the respondents would.

Certain topics or questions were directed only to the teachers. These areas and the responses were:

1. The selection procedures were considered to be ADEQUATE, EFFECTIVE or VERY EFFECTIVE by 78.5% of the respondents.

2. The information provided was rated as ADEQUATE, EFFECTIVE or VERY EFFECTIVE by 90.8% of the respondents.

3. The preliminary orientation and planning sessions conducted by the Off-Campus Team were reckoned to be ADEQUATE, EFFECTIVE or VERY EFFECTIVE by 86.2% of the respondents.

4. The on-going support by the Off-Campus Team was considered to be ADEQUATE, EFFECTIVE or VERY EFFECTIVE by 92.3% of the respondents.

5. The transportation provided by Ferguson Bus Company was more than satisfactory in the areas of promptness, driver performance, cooperation and general suitability.

6. The equipment provided at the site was only rated AVERAGE, GOOD or VERY GOOD by 73.5% of the respondents.

The majority of the topics or questions were designed to seek opinions from both teachers and parents. These findings showed:

1. Opinions about the school as a result of this experience were perceived by only 13.8% of the teachers to be IMPROVED or MUCH IMPROVED (63.1% did not know) while fully 65.3% of the parents rated the school as EXCELLENT for its efforts.

2. Opinions about the teacher were perceived by the teachers to have been IMPROVED or MUCH IMPROVED in 40% of the answers. 66.2% of parents considered the teachers as EXCELLENT.

3. Opinions about student reactions were difficult to link precisely; however,

   a. teachers felt that student reaction was BETTER THAN AVERAGE in 84.6% of the ratings and that their attitudes toward the teacher improved (49.2%) as did their attitude toward the school (32.3%) and the environment (55.4%). They also rated the conduct of the students as improving in about 30% of the cases;

    b. parents feel that student reaction was quite positive since 96.1% would send their child to the outdoor school a second time and 89 to 96.5% would send another child to the school.

4. Opinions regarding the site(s) were solicited. CAMP HORIZON was rated VERY GOOD or SUPERIOR by 90% of the teachers and 82.3% of the parents. SILVER CREEK was rated VERY GOOD or SUPERIOR by 72.5% of the teachers and 79.8% of the parents.

5. The Outdoor School staff was considered by the teachers in 76.3% of the ratings to be EFFECTIVE or VERY EFFECTIVE. Parents rated these staff people as VERY GOOD or EXCELLENT in 73.4% of the evaluations.

6. The High School Counsellors were a group which had a great deal of intimate contact with the participating children. Parents rated this component as VERY GOOD or EXCELLENT in 73.4% of the responses while the teachers ranked the counsellors as VERY GOOD or SUPERIOR in only 50.8% of the ratings.

7. The Friday Night Program was considered by 86.7% of the parents to be a good idea. Only 65% of the teachers who responded were in favour of its continuance.

8. The Parents' Meetings held at the various schools by the Off-Campus Team were rated by 86.2% of the teachers as EFFECTIVE or VERY EFFECTIVE and by 91.8% of the parents as GOOD or VERY GOOD.

We also feel that considerable attention must be directed toward site and service evaluation. In these areas I and my department are charged with the responsibility of seeing to it that only those sites which are reasonable, safe and secure are used by our people. For example, a school might elect to embark upon horseback riding lessons. When the school submits its Off-Campus Excursion Form, I examine it and if the selected destination is a riding establishment which I know to be unreliable or about which I know nothing, I may call the school to hold off activity until it is examined or I may recommend a better site from our list of accredited sites.

Further, with the great upsurge in extensive travel nationally and internationally we are bombarded with information and offers from a host of travel agents and tour organizers. Not all of these are responsible and honest, so each is subjected to a careful examination consisting of:

a. program detail
b. statements of financial responsibility (usually from a bank)
c. references from responsible parties and/or satisfied customers.

I may contact institutions like the Better Business Bureau, the Police or the Royal Canadian Mounted Police if I have any doubts about the group being examined. Those that pass this "test" become accredited agents for service to schools of our system for a period of one year, subject to re-examination and renewal after that time.

Essentially, I am a type of evaluator since from time to time when I am able, I may visit a school conducting a project to see how things are going.

Further, we feel that if someone or some office is available to help and advise teachers and to ascertain that sites are good, supervision is adequate, purposes and outcomes are stated and that parents are informed and satisfied, then projects have a better chance for success. This must serve some part of a total evaluation schema.

KING CENTER ENVIRONMENTAL EDUCATION PROGRAM

by Margaret C. Hyland and
Charles E. Kupchella*

Martin Luther King Education Center was established in 1973 by the Sisters of Charity of Nazareth at the former Nazareth College in central Kentucky. It had a strong resident environmental education program, targeted at teachers, in alliance with the University of Louisville. But there is nothing automatic about the solvency of such a program. High maintenance costs, an energy crisis, a recession, school busing controversies, a small staff too busy to practice grantsmanship, a change in sponsor philosophy—all contributed to the demise of King Center and its EE program in 1976. Yet, as the authors say, the real contribution of the short-lived center may lie in what others can learn from what did and didn't work at King.

The King Center Environmental Education Program was a component part of the Martin Luther King Education Center. King Center, located in central Kentucky, was a nonprofit organization established in January of 1973 to develop the facilities formerly occupied by Nazareth College which closed in 1972. The Center was established by the Sisters of Charity of Nazareth, a Catholic religious order, for the purpose of making effective use of the former college facilities "in promoting the development of person." Until it closed in August of 1976, King Center functioned as a year-round educational and conference center providing programs and facilities for youth, civic, and religious organizations, as well as corporations. Its programs included summer youth camps; service programs such as corporate and industrial seminars, management training institutes, and administrative workshops; an accredited Montessori program; and religious education programs; in addition to the environmental education program.

King Center encompassed most of the physical plant that was formerly Nazareth College. These include overnight accommodations for 300, a 600-seat dining commons, conference rooms, and a 1000-seat auditorium. Recreational facilities include an indoor swimming pool, a gymnasium, tennis courts, lakes, table tennis, and billiards. The Center's 960

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acres located in the rural and historical region three miles north of Bardstown, Kentucky, include wooded areas, ponds, lakes, streams, and cultivated land as well as one of the largest dairy farms in Nelson County. The facility has its own water and sewage treatment plants.

When King Center was made available for new programs, it was quickly recognized that the site was uniquely well-suited as a resident environmental education resource. The site is located within an hour's drive of over a third (more than 300,000) of the total Kentucky school population, providing many school children with the opportunity to utilize a resident center within reasonable time and cost limitations; the next nearest centers are 200 miles to the east and west. It was recognized that King Center was an excellent site for interdisciplinary study. On the center grounds are 19th-century buildings, remnants of a rail system and station, and a cemetery dating back to the early 1800's. An existing library resource was ready to be tapped and expanded to include materials for curriculum and program development and teacher enrichment. Environmental-study support facilities, in addition to the natural physical setting, include fully-equipped science laboratories and classrooms. It was immediately obvious to all educators who looked that King Center offered multiple ways and means of illuminating fundamental ecological principles and relating them to contemporary environmental problems. As an environmental education study site, perhaps the most singly outstanding and unique feature of King Center is its virtual closed system setting. The farm, the water supply, the water treatment plant, and the sewage treatment facility collectively constitute a nearly complete support system. (For a more detailed description of King Center facilities, see references 3, 4 and 5.)

The philosophy which shaped the approach to the development of the environmental program was ultimately based on the premise that the only true long-range solutions to environmental problems will have to come to grips with the shaping of basic human attitudes. The King Center environmental program was molded according to the premise that:

> We need new knowledge, new perception, new attitudes . . . We seek nothing less than a basic reform in the way our society looks at problems and makes decisions . . . It is also vital that our entire society develop a new understanding and a new awareness of man's relation to his environment -- what might be called 'environmental literacy.' This will require the development and teaching of environmental concepts at every point in the educational process (Reference 1).

Other foundations of King Center's environmental program include the views that:

a) Environmental education is not a synonym for education; rather it is a valuable unifying approach that can effectively and meaningfully tie all subject areas together. Environmental education is not a content area; it is a perspective that needs to be assimilated into the education process.

b) Environmental education is an experience-based process—making use of as much of the real world as possible in revealing the ways nature works. The social, resident experience in which students live and study together is an ideal way to consider various aspects of man's relationship to man within the context of environmental studies, unencumbered by time or classroom constraints.

c) Environmental education is not dependent upon a visit to a resident center. The role of a resident center is as much that of a catalyst as it is as a place to go for class field activities. For this reason, environmental education centers must include teacher training, consulting, and resource and curriculum development programs in their array of services.

d) The paradigms upon which environmental education must be based are the basic principles of ecology. These principles must be addressed at all levels of the educational process. A detailed discussion of these points in relation to King Center programs has been described elsewhere (Reference 2).

The uniqueness of King Center's location and array of physical facilities helped determine still another part of the philosophical basis for its programs. The comprehensive scope of human ecology makes it essential that environmental education is not represented as something that happens in wilderness areas only. Most people live their lives on the small percentage of land area taken up by cities, and it is from these enclaves that the human impact on the rest of the land is generated. There is a danger that environmental principles learned outdoors, in wilderness areas, may be disassociated from "home". For this reason the farm, which is the epitome of man/environment interaction, may be a far better environmental study site than the forest. An extensive discussion of this concept as it relates to the King Center experience appears in the Proceedings of the Fifth Annual Conference of the National Association for Environmental Education (Reference 7).

OBJECTIVES

The foregoing philosophy formed the basis for the following developmental objectives of King Center's environmental education programs:

a) to develop an increased awareness among administrators and teachers of the nature of environmental education and its potential role in the education process;

b) to develop comprehensive preschool-adult environmental education curricula patterned after successful programs elsewhere, built around the facilities of King Center, and based on the particular needs of the urban and rural population that the Center serves;

c) to develop a model, resident environmental education facility immediately accessible to the school systems of central Kentucky;

d) to facilitate the development of Environmental Education in Kentucky by providing teachers with exposure to environmental education techniques and field experience through workshop training sessions and related programs;

e) to establish mechanisms for the exchange and dissemination of information and materials among teachers in the area served by the Center;

f) to conduct research in environmental education to help determine what does and what doesn't work.

STAFF

When fully functional, the EE program staff consisted of a program director, a part-time education consultant, a resident teaching intern, a librarian, and a part-time secretary. The staff worked with teachers prior to a class visit and did not teach elementary or secondary students directly. This pattern allowed several classes to visit the center simultaneously and left the King Center staff free to work with other teacher groups at the same time. This proved to be very efficient in terms of optimum use of professional staff.

TARGET AUDIENCE

The ultimate target of King Center's environmental program was society in general. Our approach to the education of this target was through students in all categories from preschool through adult and elementary and secondary school teachers. The region served by the Center included mainly central Kentucky and southern Indiana.

PROGRAM

The environmental program at King Center consisted of four broad areas of service. There was a day use program for nearby school systems that consisted of one-day farm/field experiences. There was a resident program in which students stayed 2-5 days, living and studying together. There were teacher training programs; two workshops were offered annually in conjunction with the University of Louisville in which teachers optionally received 1-2 hours of graduate credit. These workshops were initiated through a grant from the WAVE Foundation, Inc. Each fall, Eastern Kentucky University offered a course at King Center in environmental education for elementary and junior high school teachers with Soil Conservation Service scholarships for participants. Numerous in-service programs were also conducted by the environmental staff at King Center in individual schools. Several EE adult and family weekend programs, centering on man and his everyday living experiences, were held at King Center. More complete descriptions of the curricula and activities comprising these programs have been published elsewhere (Reference 2).

FUNDING SOURCES

When the environmental program was begun in 1973, the parent organization agreed to underwrite the program's initial development. The Executive Director recognized the environmental education program as a means to strengthen the non-profit, educational character of the conference/education Center. Also, the environmental education program could be accommodated during the slowest portions of the conference center week (Monday-Thursday) and, potentially, the slow parts of the conference center year (December-March). Based on the needs assessment and projections made in 1973, it was expected that the environmental education program would become self-supporting through fees, gifts, and grants in approximately three years. Even though King Center's facilities were far superior to those found in the average environmental education center, the rate schedule was made comparable to those of nearby regional centers. Student rates (see Table 1) were not expected to cover total program costs. It was felt that to make rates cover all costs would put the Center out of reach of many students and school systems or would necessitate the maintenance of a usage load in excess of the carrying capacity of the Center.* Basically, the rates given in Table 1 covered room and board and only a small fraction of other program costs. The other costs, directly attributable to the environmental education program, annually included $21,000 in salaries and $11,000 for supplies and overhead (building/grounds) for a total annual budget of $32,000.

Over the entire three-year history of the King Center environmental program, an effort was made to secure outside funding in support of curriculum development projects, teacher training programs, site development projects, and other special programs. It was believed that only a few grants would cover the basic program (mainly staff) costs. Although there were some successes, most efforts to secure outside funding were unproductive. One local foundation, the WAVE Foundation, supported two teacher workshops resulting in the training of forty-five teachers. A number of locally-based environmental groups and organizations provided valuable library and curriculum materials. In late 1975 the Kentucky Humanities Council was approached with a program proposal. The application appeared to be well received; however, the application was withdrawn when the closing of the King Center program was announced. Subsequently, the Kentucky Department of Education, Division of

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*In its third year during the months of April and May, King Center was operated at capacity; environmental and other groups had to be turned away.

Environmental Education, expressed an interest in resubmitting the (eventually funded) application under its auspices.

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TABLE 1

KING CENTER--ENVIRONMENTAL EDUCATION PROGRAM
STUDENT RATES (1975-76)

Daily	*$8.50 (3 meals, 1 overnight)

Teachers with their classes pay student rates.

*Of this fee $1.50 went to support the environmental program; $7.00 went to cover meals and lodging. Environmental rates were significantly lower than the other King Center program rates which averaged $17.00 a day.

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Three grant applications directed to the U.S. Office of Education, Office of Environmental Education, were unsuccessful, as were a number of applications to the local J. G. Brown and Bingham Foundations.

A number of other fund-raising ideas were discussed over the three-year history of the center including contacting local businesses for contributions and sponsorships, contacting specific foundations outside the local area, establishing differential rates for peak times, and marketing wildlife prints. These were all rejected or not pursued for various reasons--including a simple lack of staff time. Ironically, the environmental education program grew so rapidly that the staff quickly became completely consumed with the day-to-day running of the program.

Through the King Center experience it can be shown that given the availability of low-cost room and board, a significant resident environmental center program within a superstructure of other programs can be maintained for a cost of $25,000 to $35,000 annually. We found the minimum staff mode of operation described above to be effective from a program standpoint. It is uncertain whether more staff or more staff time directed toward grant writing would have made a significant difference in securing funds.

HISTORY

The King Center experiment was initiated in January, 1973 with appointment of a full-time Executive Director. The Executive Director set out to establish a series of conference and educational programs which would utilize the seven-building complex and surrounding grounds in a manner consistent with the established King Center goals. A consultant was called in to assess the possibilities of use of the Center facilities in environmental studies and in February of 1973, the concept of an environmental education program at King Center was proposed. Over the next four months, various individuals were contacted about the desirability and need of such a program in the area. Endorsements were received from the State Superintendent of Public Instruction, the State Consultant for Environmental Education, and from the Jefferson County School System, the largest school system in Kentucky. Staff persons from the TVA resident facility at Land Between the Lakes in Western Kentucky and the Union College Cumberland Gap Center in Eastern Kentucky were invited to the site for consultation. In June of 1973, all superintendents from the Fourth District, in which King Center was located, were invited to a weekend meeting at the center to present to them the developments to date and receive their suggestions and comments. All endorsed the concept of an environmental education resident center program. In August, 1973, a full-time director and a part-time consultant were appointed for the environmental education program.

Steps were taken to begin to utilize the site for environmental education. The Soil Conservation Service and the Kentucky Division of Forestry were contacted to assist in an inventory of the natural resources at King Center. Both agencies proved consistently helpful throughout the duration of the program in site development areas. An environmental section was begun in the already-existing library. This remains an ongoing resource today.

In order to begin to publicize the availability of the site for resident and for day programs, mailings were sent to school systems within a 70-mile radius of the center. In addition, mailings to the superintendents and principals requested the names and addresses of individuals to whom future mailings should be directed. Acknowledgments from these inquiries initiated a direct mailing list.

Of the responses which were made from this initial mailing, one response proved to be extremely significant. For at least nine years prior to the opening of King Center, the New Albany-Floyd County School System in southern Indiana had a camping program for fifth and sixth graders. It had evolved from an outdoor, conservation program to one directed toward environmental education. This system was most interested in visiting the center to see its applicability for the fifth grade campers. After a tour of the facilities, the system agreed to bring in several of its schools in the spring of 1974. This provided an opportunity for the system to see if the facilities were appropriate from an educational standpoint and viable from a financial standpoint. It was an ideal opportunity for the King Center operation to refine its procedures for handling groups.

Besides establishing the day and resident programs, time was spent by the full-time director and part-time consultant giving talks to local community-based organizations. Several of the groups including the Audubon Society and Homemakers of America made donations to the fast-growing environmental education library. Some time was spent in researching funding/grant possibilities. In the summer of 1974 three local foundations were approached for funds to support projects including teacher education. One local foundation granted the environmental education program $2,000 in October of 1974. These funds were used to establish the first teacher workshops.

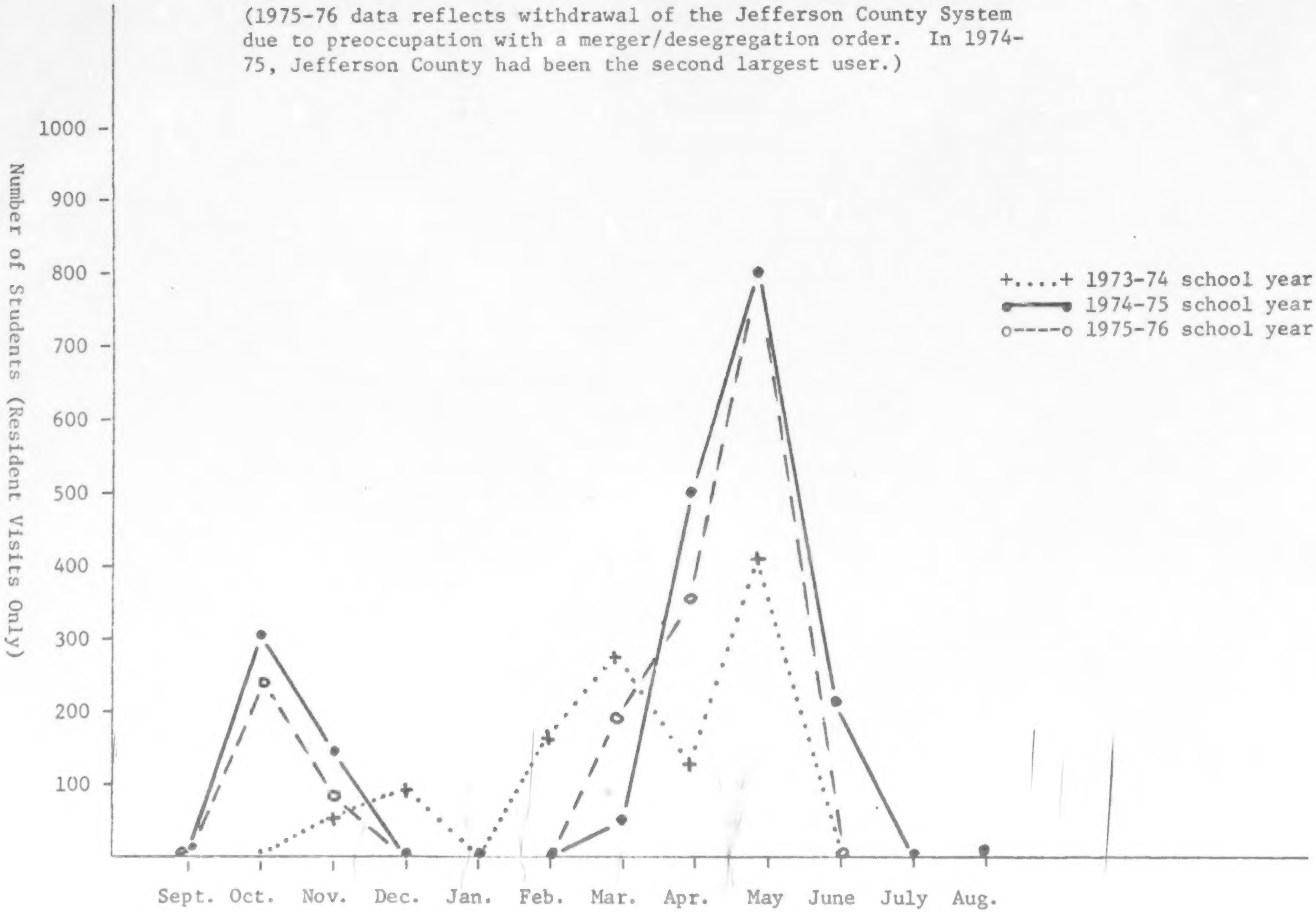
The bulk of the money went to pay room and board for forty-five teachers who participated in one of two weekend workshops held in the spring of 1975. Prospective participants were required to fill out an application form indicating their interest and experience. The workshops were announced in the school systems which were considered to be "key" ones for the future development of the center as well as the ones who had expressed interest. The basic workshop format is documented in a forthcoming article (Reference 2).

It was determined in early planning stages that it would be advantageous to be affiliated with a university. This was viewed as necessary to give greater credence to the programs in the eyes of school administrators and to provide an incentive for teacher participation via graduate credit hours. In February 1975 the University of Louisville through the Department of Biology and the School of Education recognized the teacher workshops as graduate college courses and appointed King Center's Program Director as an adjunct instructor.

It was apparent that in order to maintain and develop a program that included a broad base of activities responsive to needs of the area, an outside advisory board would be necessary. In October 1974 the King Center Environmental Education Program Advisory Committee was formed. This group consisted of three teachers, one university professor, two school administrators, the State Consultant for Environmental Education, and two citizen environmentalists. The committee served to advise the director on matters relating to program development, promotion, and fund raising. Individual members were chosen on the basis of their established interest in the program and the insight they could offer by their positions. This group was found to be extremely helpful in broadening the base of ideas and insight that led to further positive development of the program.

By the spring of 1975, 18 months after the center had opened, day and resident usage had increased significantly (see Figure 1). There was need for additional staff but as yet usage was seasonal and a new full-time position could not be justified. In May of 1975, arrangements were made with The Ohio State University to set up an internship at the center. This proved to be a suitable mechanism for both intern training and acquiring additional staff help at peak

ANNUAL PATTERN OF RESIDENT USE OF KING CENTER
1973-76



(1975-76 data reflects withdrawal of the Jefferson County System due to preoccupation with a merger/desegregation order. In 1974-75, Jefferson County had been the second largest user.)

Figure 1

times. In addition to assisting with the ongoing programs, interns lent considerable help in site development projects that expanded the program base.

In the summer of 1975, a family environmental weekend was held on a pilot basis to see if a program of recreation and environmental education for the family was feasible. This was judged to be an effective environmental education approach even though programs of this type were found to require much more staff time "per trainee" than any of the other programs. For a more detailed discussion of this program see reference 2.

During the 1975-76 school year, two teacher workshops were held, another family weekend was held, and special day-long programs on Saturday were offered on topics such as wild foods and wild flowers. During that year, Eastern Kentucky University offered an extension course for teachers. King Center provided the facility and the university provided the staff. Negotiations for a more formalized relationship with the University of Louisville, including tuition rebate, continued and progressed during 1975-76 but were overshadowed by the imminent closing of the Center.

A good part of the first semester of the 1975-76 school year was devoted to a self-study of the overall King Center concept which had been called for by the King Center Board of Trustees. The self-study was done in-house with all staff and all divisions participating. The report was received by the Board of Trustees in December 1975. In February of 1976, the King Center Board of Trustees informed the Executive Director and staff that King Center and all of its programs were to be phased out as of August 31, 1976.

The Board stated:

> "While the report gave evidence of creative and beneficial programs promoting ecumenism, serving the disadvantaged, and establishing good relationships with the many groups which it served, it also revealed internal and external obstacles to the successful promotion of the overall goal originally proposed: 'to promote the development of person and community'."
>
> " . . . An important factor contributing to the decision is the trend in the Congregation of the Sisters of Charity of Nazareth toward direct service to the oppressed, a trend evidenced by the decisions of the 1974 and 75 General Assemblies."

Officially, this was the Board's final communication to the staff members. There are some indications that further use for the Nazareth site might include an environmental education function. However, this will be an entirely new effort. The King Center episode is complete.

EVALUATION

Although numerical growth curves constitute a very precise description of development, there are other factors which must be taken into account in order to make the picture complete. A number of world and local events directly influenced program growth. During the three years of its existence, the King Center Environmental Education Program was affected by an energy crisis which caused several school systems to curtail all field trips; a recession which resulted in many schools limiting field trips, particularly overnight trips; and a merger/busing desegregation order in Jefferson County, the largest school system in the area, which effectively removed the system from further participation in the program. Even with all of these factors serving as constraints to growth, the environmental education program was running at capacity during the spring of 1975 and of 1976 (see Table 2). This can be perceived as an indication of a real need for a resident environmental education program like King Center in the area. It also indicates that a "civilized" environmental center is an acceptable site for environmental studies from the teacher/administrator perspective. Over 75 percent of the groups using the center in the 1975-76 school year had utilized the center at least one other year.

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TABLE 2

PROGRAM DATA (FOR SCHOOL YEAR SEPTEMBER-MAY ONLY)

Single Day Groups	Students	No.Schools	No.Systems
73-74	1385	--	-
74-75	3534	26	8
*75-76	1664	28	6

Resideht Student Groups	Total Students Nights			
73-74	2294	1211	18	8
74-75	3312	1735	30	9
*75-76	3324	1620	31	10

Adult Sessions	Teachers	Families
73-74	---	---
74-75	120 (5 groups)	4 (13 individuals)
*75-76	78 (9 groups)	3 (11 individuals)

*75-76 data reflect withdrawal of Jefferson County Schools from participation due to preoccupation with a merger/desegregation order. During the 74-75 school year, Jefferson County had been the second largest user.

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FINANCIAL STABILITY

In the three years of its existence, King Center's Environmental Program did not reach a break-even point. There are several factors which influenced this. The very nature of the facilities constituted a large overhead. Modern college dormitories and science labs are more costly to maintain than winterized cabins. Establishing rates accordingly would have put the program out of range for some users. Increasing the number of users during "peak" demand months was limited by other King Center programs. More time was needed in order to convince teachers that December, January and February are also good times for field work.

The inability to capture a significant grant during the three years of existence was a prime factor in keeping the program in the "red." Although a small staff helps to decrease the overall budget, it also puts constraints on the time which can be spent in grantsmanship.

One very important development had to be curtailed with the announced closing of the center; this was an academic relationship with the University of Louisville including both the appointment of the Director of the Environmental Education Program to the University faculty and a favorable financial arrangement concerning teacher training and tuition. Both of these occurrences, if they had been able to be pursued, could quite possibly have made a significant difference in the finances of the program.

EVALUATION BY OBJECTIVES

The environmental program was designed to meet the six major objectives described previously. It is worthwhile to examine the relationship of the program operation to the objectives, as well as the progress which was made in the thirty-three months that the program was in operation.

In order to "develop an increased awareness among administrators and teachers of the nature of environmental education and its potential role in the educational process," the program included a number of teacher workshops, teacher orientation programs, and inservice sessions. The increasing usage of the program attests to the success of these experiences. The gradual involvement of the University of Louisville was the result of an avid interest and extensive work by several University of Louisville teacher/administrators, including the chairman of the Biology Department and the Director of the Water Resources Laboratory.

The Environmental Education Program at King Center made a number of contributions to curriculum development. Most of what was done in this regard was shaped by King Center's urban-rural setting. Materials which were slanted toward the ecology of the civilized world as opposed to the wilderness were adapted and tested. Curriculum materials, which illustrated ecological principles through the working farm, farm ponds, farm fields, and woodlots, were adapted for elementary and secondary groups, teachers and families. The intern program helped increase the curriculum base through intern-initiated projects.

Not much had to be done to create a model resident program at King Center. The centralized location, the superb facilities, and the closed system setting made the center operational from the first day. Some site development was carried out such as hiking trails, but these were extra amenities to an ideal site. Both the rapid growth of the program and the designation of King Center as a National Environmental Study Area by the Department of the Interior attest to its availability and suitability.

Being part of a large organization with several distinct and varied branches had both its benefits and its problems. Support services such as food, housekeeping, maintenance and grounds were ongoing operations. Costs were shared by all divisions and the overall support staff freed the environmental staff to concentrate on environmental education. Problems included the occasional incompatibility between the environmental youth groups and adults in other programs. This limited usage in some cases. Being part of a larger organization made it difficult to determine precisely program costs in every case and tied survival of one program to survival of the whole.

The King Center program was a teacher-oriented program and the training objective permeated the entire operation. Teachers were given formal environmental education training through workshops that carried optional graduate credit. Teachers bringing a group overnight were given a one-two hour orientation to the site and its program possibilities. Special Saturday programs were offered to fill in areas of general interest to teachers. This teacher approach was a valuable and successful one. As a result of the King Center program there are now significantly more environmental educators in the region.

To address the objective of information dissemination, many environmental education materials were made available to teachers in the area through the library. Because of its centralized location, King Center was the regional center for inservicing of school systems' environmental education coordinators (a program established through the Kentucky Department of Education). In May 1976, King Center was the site of the first Kentucky State Conference on Environmental Education attended by more than 100 educators, government agency persons, and business and industry representatives.

The entire King Center endeavor was a research project. Evaluation of need and of the effectiveness of the programs were continuously ongoing via feedback from workshop participants and school groups, and the input of the Advisory Committee. Because of its short lifespan, the real contribution of the King Center experiment to the field of environmental education may be in what others can learn from this experience.

What did and didn't "work" for the King Center operation has been addressed in this chapter. Those of us intimately involved in the King Center environmental education program, in reflecting on its two and one-half years of full operation, agree that given the same opportunity again, the same basic approach would be used. Most of what didn't work was the result of uncontrollable variables.

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METRO-APEX, AN ONGOING TASK FOR ENVIRONMENTAL RESEARCH, TEACHING AND EDUCATION

by Mark James*

METRO-APEX is as far-out as it sounds. It marries computerized simulation and gaming to environmental education of a specific type. Based on a computerized urban planning game, M-A focuses on a pollution control exercise; its purpose, to train environmental quality managers and technicians, pre-service and in-service. It is estimated that over 100,000 persons have played M-A in nine countries. As problems and regulations change, M-A can be re-programmed to adapt to its new environment. As an educational device in dealing with environmental issues in an urban setting, METRO-APEX may be the most sophisticated in being.

American concern with the growing and ominous presence of urban air pollution up to 1963 was primarily characterized by scattered local operations of generally limited scope. On December 17, 1963, a national framework of action was mobilized by the passage of the Federal Clean Air Act. This was the first comprehensive move on a national scale to assist in the urgently needed establishment and development of local and regional air pollution control programs throughout the United States.

In developing and carrying out the new program of Federal assistance, the Division of Air Pollution, U.S. Public Health Service, anticipated the need for growing numbers of trained administrators. At the request of the Division of Air Pollution a distinguished group of national leaders from all levels of air pollution control met in conference at the Airlie House in Virginia. As a result of this meeting, the Air Pollution Control Institute was established at the University of Southern California in January 1965 under a Division of Air Pollution Control Training Grant (Leffland, 1966).

Initially, the curriculum of the Air Pollution Control Institute (APCI) was built on traditional lecture seminars, plus field observations. The mounting importance of APCI in preparing sufficient numbers of well trained air pollution control administrators called for the introduction of highly refined training techniques offering maximum coverage and impact in a limited time.

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In June 1966 the Division of Air Pollution, U.S. Public Health Service, awarded a grant to the University of Southern California to develop an Air Pollution Control Institute COMputer EXercise; thus the beginning of COMEX. The primary objective was to enhance the value of the six-month Air Pollution Control Institute curriculum by incorporating computer simulation and gaming techniques. It was felt that student comprehension would be significantly increased by the opportunity to relate course material to vital, changing circumstances, and to test the probable effects of alternative administrative decisions on typical problems through the simulation exercise.

The first product of COMEX was COMEXOPOLIS, patterned after Richard Duke's computerized urban planning game, METROPOLIS (Duke, 1964). This was a modification of METROPOLIS that incorporated air pollution subject material in the context of an urban-oriented man-machine simulation.

Parallel to the development of COMEXOPOLIS, COMEX began developing POLLEX (POLLution EXercise). The POLLEX Game was to have three major roles: air pollution control officer, politician and industrialist (Leffland, 1968).

In 1968 the Air Pollution Control Administration granted a three-year extension of the COMEX Research Project. The primary objective was to continue the research and development of POLLEX.

By 1966 Richard Duke had completed development of the M.E.T.R.O. Project. The broad objective of the M.E.T.R.O. Project was to develop an instrument which had the capability of demonstrating to professional planners and to other decision makers the consequences of alternative decision chains on the metropolitan growth pattern, through the use of a simulated environment (Meier and Duke, 1966). The technique was intended to simulate growth patterns which would occur naturally and enable their comparison with planned growth patterns. M.E.T.R.O., while not geared toward environmental concerns, did provide a basis for which a new environmental game would eventually evolve.

In 1969 the COMEX Research Project at the University of Southern California and the Environmental Simulation Laboratory at the University of Michigan combined their efforts to produce the APEX game (Air Pollution EXercise). The role of the School Board was dropped from the M.E.T.R.O. exercise, and the Air Pollution Control Officer and the Industrialist role from the POLLEX game were added.

APEX evolved into a computerized gaming simulation which included two main components, a simulated environment and certain gamed roles each with several subparts and the essential links which tie the system together. In APEX, the key simulation is a metropolitan area with data and models representing the physical environment which includes both the public and private sectors. Within this environment are the gamed roles. The two parts are linked together by computer printout which represents both the inputs of the participants' decisions as well as the simulated environment (EPA, 1974).

***

HISTORICAL DEVELOPMENT OF METRO-APEX

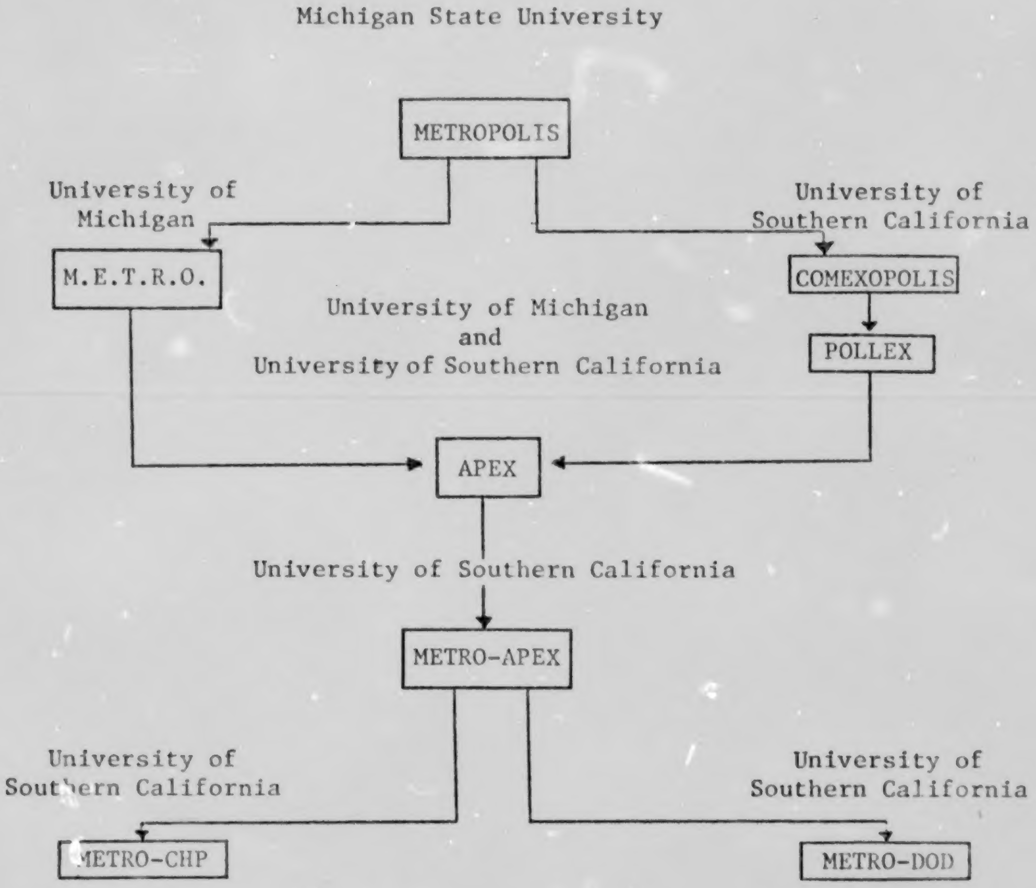
Michigan State University
METROPOLIS
University of Michigan
M.E.T.R.O.
University of Southern California
COMEXOPOLIS
POLLEX
University of Michigan and University of Southern California
APEX
University of Southern California
METRO-APEX
University of Southern California
METRO-CHP
University of Southern California
METRO-DOD

Figure 1

***

The growing success of APEX resulted in a training grant to enable universities and training organizations at various locations throughout the country to utilize and operate the APEX simulation exercise. Because of the complexity of the game, it is not easily transferable to other sites without detailed instruction on its use.

Intensive one-week training sessions were developed dealing with the operation and application of the game. These sessions included game structure, preparation and logistics, game instruction, computer operation and integration of APEX into ongoing training modes. A list of those schools and universities trained in APEX has been included in Appendix II.

With the passage of the 1970 Clean Air Act Amendments, COMEX recognized the need for major modifications to the existing APEX game. Major reorganization had occurred at the Federal level with the National Air Pollution Control Administration now becoming a part of the Environmental Protection Agency. COMEX proposed the development of a County Environmental Quality Agency in the APEX game. Under the umbrella of the proposed Environmental Quality Agency role, COMEX also proposed two new roles: the Solid Waste Manager and the Water Quality Manager. The existing Air Pollution Control Officer role also fell under the direction of the Environmental Quality Agency.

At the same time, roles of Pressure Groups and Interest Groups were formalized. This was done in response to the criticism that the public was not represented and should not be totally simulated by the computer. Manuals were published, and like its predecessor, this version was disseminated. For the past two years the COMEX Project has been funded to act as the main distribution center for the METRO-APEX game.

The METRO-APEX game (and its derivations) is currently in use in approximately 60 universities and colleges in the United States. It is also used by eight foreign countries: Germany, France, Netherlands, England, Venezuela, Mexico, Italy, and Canada. It is estimated that well over 100,000 people have participated in METRO-APEX. Fortunately, this research effort is not one in which a report is written and then remains on a shelf. Instead, METRO-APEX remains an active and ongoing environmental education technique.

Two additional offshoots of the game have evolved, METRO-CHP and METRO-DOD. METRO-CHP deals with the problems relating health care delivery service programs to an urban community. The roles included in this game were the comprehensive planning agency, hospital administrators, health services agency, public health department and health maintenance organizations. METRO-DOD introduced the armed services role and the problems faced in a community with the re-activation of a military base. The participants were concerned with Environmental Impact Statements as required under the National Environmental Policy Act of 1969.

Changing technology and legislation can quickly make most research, training, and educational efforts obsolete. As the Project continues to sustain its funding, newer models may replace older ones, better and improved data update obsolete files. METRO-APEX can be a very effective method of keeping pace with changing times. In this manner the game becomes representative of the latest research and development.

METRO-APEX INTERACTION DIAGRAM

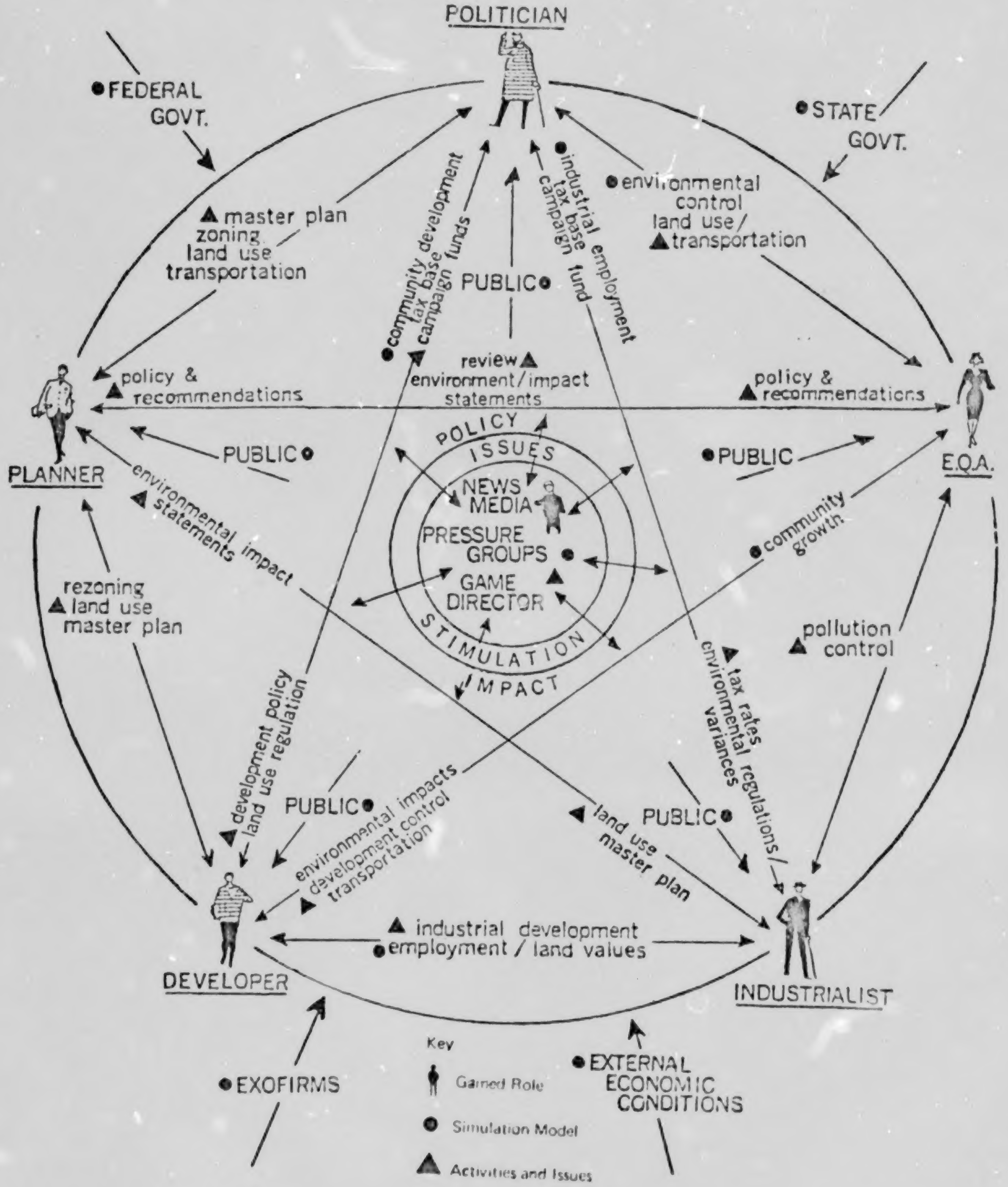
POLITICIAN
● FEDERAL GOVT.
● STATE GOVT.
▲ master plan
zoning
land use
transportation
● community development
tax base
campaign funds
PUBLIC ●
● industrial employment
tax base
campaign fund
● environmental control
land use/
▲ transportation
▲ policy & recommendations
review ▲
environment/impact statements
▲ policy & recommendations
PLANNER
PUBLIC ●
POLICY
ISSUES
NEWS MEDIA
PRESSURE GROUPS ●
GAME DIRECTOR ▲
STIMULATION
IMPACT
● PUBLIC
E.Q.A.
environmental impact
▲ statements
● community growth
rezoning
▲ land use
master plan
▲ development policy
land use regulation
▲ tax rates
environmental regulations/
variances
▲ pollution control
PUBLIC ●
environmental impacts
development control
▲ transportation
▲ land use
master plan
PUBLIC ●
▲ industrial development
● employment / land values
DEVELOPER
INDUSTRIALIST
● EXOFIRMS
● EXTERNAL ECONOMIC CONDITIONS
Key
Gamed Role
● Simulation Model
▲ Activities and Issues

Figure 2

Recently the Project has been awarded another research grant to include the requirements as specified in the Federal Water Pollution Control Act Amendments of 1972. Specific tasks include:

1. Incorporation of 208 Water Planning Agencies within game;
2. Addition of state environmental water quality role;
3. Expansion of water and lake models;
4. Modification of sewage treatment plant options;
5. Incorporation of non-point sources of water pollution;
6. Incorporation of on-line capabilities for input made by player decisions;
7. Expansion of graphics and visual aids.

EVALUATIONS

Evaluations on METRO-APEX have been conducted since the game was first devised. These evaluations have taken two forms. At the completion of the last cycle of play a debriefing session is held. Here, oral feedback concerning the events which have transpired is related to everyone. Hidden strategies and motives are revealed. Participants are asked to step out of their roles and begin to relate their actions in the game to real-world analogies.

The second form of evaluation incorporates a written questionnaire which asks the respondent to describe not only the content of the game, but also the process. In this manner, improvements to the game are recommended, then researched, and if valid, implemented.

In a study done by Floyd and Washburn (1972) an analysis was made to determine if the following variables were significant with responses to an APEX questionnaire: time spent introducing the game, number of cycles played, average length of cycles, type of run, number of STEP's (Supplementary Training Exercise Programs), time for the critique, total time for the run, use of preliminary information, type of introduction, number of participants, age of participants, educational background, highest academic degrees, years of work experience, student status, and air pollution involvement. They found no significant differences.

In an evaluation of a course entitled "Administrative 208-Workshop in Administrative Problem-Solving," at the University of California, Irvine, Hackathorn (1973) found (1) APEX is not only concerned with air pollution but other aspects of the urban environment; and (2) APEX is an effective tool at the professional graduate level.

Pratt, King and Floyd (1973) found extremely positive results on the questionnaires from twenty different presentations of APEX. Schools represented in their survey included the University of Southern California, the New England Consortium on Environmental Protection, the Triangle Universities Consortium on Air Pollution, the Pacific Southwest Universities Consortium, the Middle Atlantic Consortium on Air Pollution, the University of Illinois, and the University of Arizona. One aspect of their study was a longitudinal survey of participants which showed that 2/3 of the students found the game beneficial in their work activities.

Updegrove and VanHouweling have conducted extensive research around METRO-APEX (1975). They pointed out some of the complexities in obtaining reliable quantitative measures which can substantiate information gained through participant observation and student evaluations. Three separate but related studies were conducted. The first compares learning (utilizing several measures) in the METRO-APEX game centered around a traditional urban politics course. The second investigates performance in the game as a function of extra-game participant variables such as class, major, and sense of personal efficacy. Finally, learning and performance in the role played were investigated. While many variables were compared, no significant conclusions were reached.

In almost every case where a properly trained staff conducted the game, feedback has indicated that students are able to see the important interactions within a community.

Any discussion on evaluations done on METRO-APEX should consider some of the following problems, associated with the simulation:

1) A model may be developed, tested and validated with empirical data. When incorporated into the game, the feedback provided to the participants in our simulated environment may not be appropriate. Therefore, the model may have to be altered.

2) The addition of new models may not include the assumptions of previous models. Therefore, either the new or existing model may have to be changed.

3) Problems associated with an earlier version of the game may be corrected on a later version.

4) There are people using the game not trained by COMEX. Therefore, inappropriate feedback may be given to participants due to a lack of understanding about the models, options available, incorrect processing, etc.

Each of the problems identified above must be considered on an evaluation of METRO-APEX. The evaluation conducted for one group may not be appropriately compared to another group.

METRO-APEX has been used extensively as an educational device in dealing with environmental issues in an urban environment. It is the intent of COMEX to continue to update, modify and disseminate METRO-APEX.

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APPENDIX I

Funding Awarded to the COMEX Research Project
Associated with the Development of METRO-APEX

FUNDING AGENCY	TITLE	FROM	TO
Health, Education & Welfare/U.S. Public Health Service	COMEX-Air Pollution Control Research Project	6/ 1/66	5/31/67
		6/ 1/67	5/31/68
		6/ 1/68	5/31/69
		6/ 1/69	5/31/70
		6/ 1/70	9/31/71
	Pacific Southwest University Association (PSUA)	7/ 1/71	6/30/72
Environmental Protection Agency	Environmental Management Institute	7/ 1/71	6/30/72
	Training in Use of APEX Gaming Simulation	11/71	1/31/73
		2/ 1/72	1/31/73
	Environmental Management Institute	7/ 1/72	6/30/73
Health, Education & Welfare/Health Service and Mental Health Administration	Comprehensive Health Planning Simulation Exercise	11/ 1/72	4/30/73
Environmental Protection Agency	Training in use of APEX Gaming Simulation	2/ 1/73	6/30/74
	Environmental Management Institute	7/ 1/73	6/30/74
Health, Education & Welfare/Health Service and Mental Health Administration	Training/Studies and Demonstration in Comprehensive Health Planning	7/ 1/73	6/30/74
Environmental Protection Agency	Dissemination of APEX II	7/ 1/74	6/30/75
Army Corps of Engineers, Dept. of Defense	Presentation of Simulation Exercise for D.E.M.O., Ft. Lee, Virginia	1/15/75	6/30/76
Environmental Protection Agency	Dissemination of APEX II	7/ 1/75	6/30/76
	Research and Development of METRO-APEX Water Planning Gaming Simulation	5/ 1/76	4/30/78
	Dissemination of APEX II	7/ 1/76	6/30/77

APPENDIX II

Universities Trained in the Use of METRO-APEX

Adelphi University
American University
Athens College
BETURE (Paris)
Bowling Green State University
Bradley University
Brown University
California Institute of Technology
California State Polytechnic University at Pomona
California State Polytechnic University at San Luis Obispo
California State University at Fullerton
California State University at Sonoma
Centenary College
Claremont Colleges
Clemson University
College of the City of New York
Colorado State University
Columbia University
Cooper Union
Cornell University
Cuidad Universitaria, Mexico
Denison University
Drexel University
Faculte du Droit (Paris)
Florida Institute of Technology
George Washington University
Georgia Institute of Technology
Governors State University
Harvard University
Houston Community College
Howard University
Hunter College, City University of New York
Illinois Institute of Technology
Iowa State University
Johns Hopkins University
Kansas State University
Kirkwood Community College, Iowa
Loma Linda University
Louisiana State University
McGill University, Montreal, Quebec
Mankato State College
Massachusetts Institute of Technology
Memphis State University
Metropolitan State College

National Polytechnic Institute (Mexico)
New York University
North Carolina State University
Oklahoma State University
Old Dominion University
Ohio State University
Pennsylvania State University
Pepperdine University
Princeton University
Rensselaer Polytechnic Institute
Roosevelt University
Rutgers University
San Jose State College
Simon Bolivar Universidad, Caracus, Venezuela
Southern Methodist University
Southwestern University
Spelman College, Georgia
Stanford University
Staten Island Community College
Texas A & M University
United States Air Force Academy
University of Arizona at Tucson
University of Birmingham, England
University of California at Berkeley
University of California at Davis
University of California at Irvine
University of California at Riverside
University of California at San Diego
University of California at Santa Barbara
University of California at Santa Clara
University of Colorado
University of Colorado, Medical Center
University of Denver
University of Florida
University of Hawaii
University of Houston
University of Idaho
University of Illinois, School of Public Health
University of Illinois at Urbana
University of Louisville
University of Maryland
University of Michigan
University of Missouri
University of New Mexico at Albuquerque
University of Notre Dame
University of Oklahoma
University of Pittsburgh
University of Puerto Rico
University of Rhode Island

University of Santa Clara
University of Southern California
University of Southwest Louisiana
University of Tennessee at Chattanooga
University of Texas at Austin
University of Texas at El Paso
University of Victoria, British Columbia
University of Washington
University of Wisconsin
Virginia Commonwealth University
Virginia Military Institute
Walla Walla College
Washington State University
Washington University, Missouri
West Virginia University
Yale University
York University, Toronto, Canada

EXTENSION'S CONTRIBUTION TO ENVIRONMENTAL EDUCATION

by W. R. Jenkins, Harold I. Owens,
and Lawrence Heffner*

The largest and in many ways the most effective informal adult education activity in the United States is the Cooperative Extension Service, a remarkable alliance of the federal Department of Agriculture, state land-grant universities, and local instrumentalities--epitomized by the "ag agent" in virtually every county seat in the country. Where once he may have been promoting some deleterious farm practices, today the county agent is starting to develop lines of communication with community conservation commissions and other public and private environmental groups; and he is being supported by an increasing array of environmental education materials emanating from the universities. Among the most comprehensive is a complete independent-study course offered for credit or non-credit through the Michigan Extension Service, emphasizing the interplay of "the environment and the citizen." The University of California Extension Service has just started an energy education outreach program to carry energy conservation information to every county in that state, based on an inter-disciplinary energy and resources research group at Berkeley. University of Wisconsin Extension has developed a unique consultative relationship with associations of lakeshore property owners throughout that state.

As this case study attests, however, the bulk of the Co-op Extension effort retains the conventional focus on helping rural people attain the good life in the presence of old and new environmental constraints.

Extension's leadership role and initiative in environmental education is based on its strengths and acceptance by farmers and rural people. It is "mission oriented" and works with its many audiences to "help them help themselves." This closeness to people and their problems has resulted in establishing confidence and trust, permitting the introduction of new ideas and technology. This philosophy and attitude requires new sources of expertise and information for new ideas and solutions. The way was pointed out for interdisciplinary approaches to problem solution. Extension has long been an advocate of the team approach and usually is involved in assembling the team.

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Environmental problems and necessary educational programs have not bothered extension greatly because of its well-tested basic method of operation.

To be competitive and economically solvent, farmers have been forced to adopt new cultural, husbandry, and pest management practices. Extension programs in these areas have automatically included emphasis on environmental pollution control. Polluting the environment is costly and not consistent with good management practices emphasized in Extension's education programs.

SOIL CONSERVATION AND EROSION CONTROL

Most people recognize the general need for soil and water conservation. Few may not appreciate its significance to them personally. The wealth of a nation depends to a major degree upon the natural resources available to it, the determination and resourcefulness of its people, and the efficiency with which people manage resources for the common good. Future generations are entitled to a share of the rich natural resources of soil and water heritage with which the present generation was endowed.

The individual landowner or operator is concerned with maximum efficiency of operation. Efficient land use is a major factor in the amount of farm income. This income may determine whether the total effort represents a struggle for only the necessities of life or whether it will provide for the extras which increase the farm family's standard of living. A basic factor in this efficiency is using the land within its capability and treating it to maintain or increase its productivity on a sustained yield basis.

Basically, the job of the Cooperative Extension Service is teaching. The final objective of Extension work is the enhancement of people's lives. Three distinct kinds of Extension responsibility exist in the areas of soil and water resource conservation:

1. We encourage all people to accept, as citizens, a feeling of responsibility and concern for resource conservation to the extent that they contribute individual efforts toward its accomplishment.

2. Individual farm families must be given practical help in developing and using the natural resources under their control. The goal here is to help develop expertness and responsibility in resource management.

3. Initiative must be provided in community and regional programs to develop expertness in group efforts at natural resource management. We can provide leadership, cooperation, and special knowledge to the groups. We can also bring experience in working with groups of people on public policies relating to the soil and water resources.

SOIL AND WATER CONSERVATION IN THE 1930'S

In the 1930's, particularly the latter half, state Extension specialists and county Extension agents held method demonstrations across the country to show farmers how to construct soil and water conservation measures. In Carroll County, Missouri, the county Extension agent provided the leadership in building a set of terraces on a field in the Center Grove community. These were the first terraces built in the community and served as a demonstration to the neighboring farmers on how to protect the soil from water erosion.

Farmers were given assistance with planning and layout of contour lines, strip cropping, terraces, ponds, and other erosion control structures. County Extension agents worked as a team with Soil Conservation Service technicians, the Agricultural Stabilization and Conservation Service, incentive cost-sharing funds, and Civilian Conservation Corps personnel in establishing soil and water conservation demonstrations on complete farms.

It is essential that the farmer make a reasonable income while conserving and improving the soil and water resources. On these demonstrations farmers were given counsel on cropping practices, field arrangements, rotation of crops and soil fertility management, in order to produce higher value crops like alfalfa, and pasture management for the farm unit.

EXTENSION PROGRAMS CHANGE

Initially, Extension agents and specialists provided considerable on-site services in helping to plan and layout soil and water conservation practices to serve as demonstrations. Extension specialists and county Extension agents continued aggressive soil and water conservation educational programs during the 1940's, 50's and into the 60's. Gradually, the individual on-site assistance was turned over to Soil Conservation Service technicians, the ASCS staff, soil and water conservation contractors, and others who had received training in assisting farmers with conservation practices. Extension specialists and agents became increasingly concerned with area problems. Watersheds, river basins, soil and water conservation districts, and other soil and water districts received their coordinating talents.

CURRENT EXTENSION ROLE

Currently, the Extension programs continue to provide information which will encourage individual decisions which support the public as well as the private welfare. Since soil and water conservation relates to agricultural programs, this phase of natural resources is included under agriculture. Extension's agricultural programs in soil and water conservation emphasize:

1. Soil conservation, resource conservation, and other development districts.

2. Land use planning.

3. Watershed improvement.

4. Public understanding of conservation programs.

Extension work in soil and water conservation uses the conservation programs and technical services of other USDA agencies as much as possible, especially those of the SCS and the ASCS.

The broad objectives of Extension programs are:

1. To help landowners understand soil and water conservation problems, their effects on agricultural production, and the general economy and the need for cooperative action to solve them;

2. To help landowners understand the long-range planning for management and use of their soil and water resources and the economic alternatives available to them for developing these resources;

3. To assist landowners in cooperative planning for development of soil and water resources on a complete watershed basis;

4. To help the general public understand soil and water problems and support programs directed at solving them.

YOUTH TRAINED TO APPRECIATE SOIL

State Extension specialists and county Extension agents, in cooperation with SCS technicians, vocational agricultural teachers and others train youth in the appreciation of the soil resource by teaching soil classification or "land judging." Land judging has become one of the most active youth educational projects. States conduct county, district, and state judging activities. States send land judging teams to the national event held at Oklahoma City each year. The 1976 event drew some 900 participants from 33 states.

EXTENSION EDUCATION'S ROLE WITH FEDERAL AND STATE ENVIRONMENTAL CONTROL AGENCIES AND REGULATIONS

The basic role of the Cooperative Agricultural Extension Service system is that of education through the dissemination or transfer of useful and practical information to decisionmakers and other potential users related to the agricultural community at local, state and federal levels. Accordingly, Agricultural Extension's role with environmental regulatory agencies is that of educational cooperation to provide objective, factual information to the agricultural community and other audiences on evolving environmental regulations at federal, state, and local levels, and to identify farmer's options in adjusting to them.

Through informal educational coordination with other agencies, Agricultural Extension Services also assist in the development of reasonable, practical environmental regulations for the maintenance of optimum national food and fiber production and the enhancement of related environmental quality at local, state and national levels. However, Agricultural Extension Services avoid activities which might be construed as essentially regulatory in nature and intent.

Prior to the creation of the national regulatory U.S. Environmental Protection Agency (EPA) in 1970, the Cooperative Agricultural Extension Service system (CES) had for many years conducted educational programs for environmental quality improvement in agricultural problem areas such as soil and water conservation, animal and crops waste management, animal and plant disease management, and pest management.

Since then, CES has strengthened environmental quality protection programs at federal, state and local levels through coordination with the Extension Committee on Organization and Policy (ECOP), EPA, other federal and state agencies, and the agricultural community. Examples of such coordination are:

> Cooperative CES-EPA pesticide safety and pest management programs in recent years throughout many states.
>
> Cooperation with the Universities-EPA-USDA coordinating committee to identify research and educational needs and priorities for various environmental problems. Resulting from this coordination were jointly sponsored national and regional conferences on Recycling Municipal Sludges and Effluents and Effluents on Land in Champaign, Illinois, in 1973, and Educational Needs Associated with the Utilization of Wastewater Treatment Products on Land in East Lansing, Michigan, 1974.
>
> Development of an ECOP strategy report on A People and Their Environment, analyzing ten environmental issues, with recommendations for strengthened federal-state-local CES programs to assist in their resolution.
>
> Development of a national EPA-ECOP cooperative workshop on Agricultural Nonpoint Source Water Pollution Control, held in Washington, D.C., 1974.
>
> Cooperation with EPA, other agencies and the concentrated animal feeding industry in the development of reasonable and practical regulations for the control of related point source water pollution. This cooperation had been preceded by a six-state CES pilot project for the development of educational information to assist the cattle feedlot industry in the Great Plains to conform with evolving local, state, and federal regulations.

To further strengthen USDA coordination with EPA and other agencies in the development of mutually constructive environmental programs at federal, state, and local levels, the U.S. Secretary of Agriculture established USDA work groups for the following environmental laws in 1976: Federal Water Pollution Control Act; Federal Insecticide, Fungicide, and Rodenticide Act; Solid Waste Disposal Act; Occupational Safety and Health Act; Toxic Substances Act; Clean Air Act; Clean Drinking Water Act; and Endangered Species Act. The Extension Service is represented on each of these work groups in coordination with representatives of other USDA agencies.

Through cooperation with these work groups ES-USDA is in a position to inform State Extension Services of evolving developments in implementing these laws and to cooperate with ECOP, EPA, and other agencies in the development of related, constructive Extension educational programs.

A current example of such cooperation is the development in some states of Extension educational programs to coordinate with other federal, state and local interests on areawide waste treatment management plans to improve control of nonpoint and other sources of water pollution from agricultural lands. As most agricultural sources of water pollution have been designated by EPA to be nonpoint in origin, management of such pollution sources will command increasing attention in the future.

EXTENSION PROGRAMS IN ANIMAL WASTE MANAGEMENT

Educational programs on handling animal wastes (manure) originated with Extension agronomists and soils specialists. The purpose was to help farmers improve the fertility and tilth of soils and increase crop yields. While the objectives were related to crops, animal wastes were utilized and relatively non-polluting.

However, modern animal and poultry production, based on years of improved technology, has resulted in great livestock, dairy, and poultry concentrated operations. The increased emphasis and ease of using commercial fertilizers, coupled with the development of the large animal and poultry production units, have changed the picture drastically.

Farmers lost interest in the use of manure to increase fertility of soil because of difficulty in handling and higher costs related to benefits. Crop production practices changed to emphasize use of inorganic fertilizers, with little emphasis on utilization of animal wastes.

The change in attitudes, cultural and husbandry practices, concentration of large specialized poultry and animal units (many near large population centers), economic squeeze, and emphasis on environmental quality again forced drastic changes in Extension programs.

In order to counter charges of nuisances (odors, dust, flies, etc.) and to comply with pollution control regulations, livestock, dairy, and poultry producers have in recent years been faced with serious problems not experienced before the days of large specialized animal production units.

The evolution of Extension environmental education programs has been, progressively, directed toward animal pollution, waste disposal, waste utilization, waste management, and waste recycling. As the economic and regulatory changes have arisen, new technology and educational programs have been required. The shifts have been most dramatic in an effort to help animal production units meet the changing, many-faceted situations they face.

Any effort to solve animal waste management problems must fall within the parameters of economics, technology, legal limits, social situation, and political climate. Each one singly and in relation to each other prevents a simple approach to the problem of controlling environmental pollution by the animal industries including processing plants, slaughter houses, and feed mills.

Special Extension efforts to identify and organize needed expertise in animal waste management were started with a National Symposium on Poultry Waste Management in 1963, at Lincoln, Nebraska. The idea of planning and conducting the conference originated with concerned Extension specialists in poultry and agricultural engineering. In 1964, a follow-up conference covering the same subjects was held in Lincoln. The proceedings from these poultry conferences have served as the bases for greatly expanded Extension efforts in animal waste management.

Extension has been highly involved in planning and development of International Symposia on Livestock Wastes in 1966, 1970 and 1974. Many state and regional conferences are conducted each year in order to expose new technology, and methods of controlling pollution through better means of utilizing animal and poultry wastes.

State Extension personnel are conducting field trials, tests, and problem solving activities in most states on problems related to animal production and processing and environmental pollution.

The real benefit of Extension's activities in these programs has been to attract the attention of research institutions and other organizations. As a result, a great many research and government resources are now being directed toward solving animal industry problems related to environmental quality.

ENVIRONMENTAL EDUCATION IN THE SUNSHINE

by David E. LaHart and C. Richard Tillis*

Florida's sunshine tree turns out to bear environmental education fruit. In this well-organized case study we get an excellent summary of the striking characteristics of the environmental education apparatus in the state of Florida: 1) An early state environmental education act—with state funding; 2) an early state master plan and action guide; 3) a committed chief state school officer; 4) a central office, with coordinators in each school district and on each university campus; 5) strong support and participation on the part of organizations not in the formal educational structure; 6) a broad-based state advisory council; 7) model curricular materials that can be adapted to local situations; 8) mini-grants to local schools for planning and implementation activities; 9) teachers-teaching-teachers workshops; (10) student ecology clubs and training conferences; 11) cooperation from business and industry; and 12) responsive environmental management statutes on the part of the state legislature.

Perhaps as in no other state, environmental education in Florida is an all-hands proposition.

INTRODUCTION

Unquestionably, Florida is blessed with more inherent natural assets of land and water, wildlife and climate than exist in similar combination anywhere else in the United States. With this rich legacy of natural resources and beauty at its command, Florida truly possesses an abundance of resources for all to enjoy.

The major environmental problem areas encountered by this generation are reflected in the rapidly accelerating growth and development patterns of the nation at large. Communities in all parts of the country today are beset by environmental problems brought on by technological changes and urbanization. Clearly, this is a national dilemma, but the need to control and improve the quality of Florida's environment is made more urgent because of its continuous rapid growth

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**Mr. LaHart is employed by the Environmental Education Project, Florida State University, and as a private environmental consultant. Mr. Tillis is Director, Office of Environmental Education, Florida Department of Education, Knott Building, Tallahassee, Florida 3230* and development; the two are inseparable. These effects are more serious to this state because of the importance of its outdoor environment to the people and the economy.

Florida's environmental problems are national news. The water problems of the Everglades National Park, the Cross Florida Barge Canal, the super-jet-port issue and Florida's fantastic population growth are known throughout the United States. Many people see Florida as a microcosm in which the problems and future of our nation and our world may be observed.

These facts, along with Florida's abundant university talent, innovative educational systems, and legislatively proclaimed interest in environmental education makes Florida the ideal educational laboratory to pursue the answer to those environmental problems now seen as endangering the future of all.

A THUMBNAIL HISTORY

For the past thirty years, a continuous drive has been underway to get environmental education into Florida's public schools. A Resource Use Education Committee, appointed by Governor Millard Caldwell (1945-49), was the first official agency to collect data and report the public's expressed need for environmental education.

Since that time, multiple surveys have identified a continued need for a coordinated state-wide environmental education effort. Florida's rapid population growth and development rate tend to increase the need to act. Florida is changing. An electorate knowledgeable as to environmental issues can and must continue to influence the direction and rate of this change.

In 1970, the Florida Legislature acted on this need by passing the first of a series of legislative acts which established the Florida environmental education program. The Environmental Education Act of 1970 provided a state coordinator, an adequate budget, and a mandate that the Department of Education develop a state program in environmental education. The Florida Master Plan and Action Guide for Environmental Education (Tillis, 1972) contained the plan requested by the Act.

The Environmental Education Act of 1973 (Appendix I) provided the essential staff and structure to begin serious state assistance toward implementing Florida's Master Plan. The Florida model has been adapted for use in several other states and is recommended by national organizations such as the National Wildlife Federation and the American Institute of Architects (Stefany, 1975).

Since 1970, Florida's population has grown 23 percent; a population of 10 million is projected for 2000. State planners have also projected a 50 percent increase in violent crimes and that all of the land in Southeast Florida, which can be, will be developed. These and many other serious problems have increased Florida's need for continuing its solid environmental education program.

Florida's environmental problems have led an enlightened Legislature to preserve our high-quality environment by passage of several landmark pieces of environmental legislation such as the Environmental Land and Water Management Act, environmental agency reorganization, the authorization for a 240 million dollar endangered lands program, and the 1975 Local Government Comprehensive Planning Act. These legislative acts are outstanding, but they work only with an electorate which is knowledgeable of their purpose and promise. Private citizens, corporations, and private and public agencies and governments must understand our environmental laws to see their importance. Governmental agencies must enforce the laws to protect the public's rights, yet allow citizens to accomplish their personal goals where public conflict can be avoided. Because of this, environmental education has grown to merge both formal and non-formal educational systems.

A FUNCTIONAL STRUCTURE

The Office of Environmental Education is strategically located directly on the staff of the Commissioner of Education. This location enables the Office to coordinate and provide necessary planning information to the three Divisions (Public Schools, Universities and Colleges, and Vocational-Technical) in the Department of Education. This placement provides high visibility and a functional pathway for implementing environmental education in Department policy and planning.

In addition to the Director, the Office of Environmental Education employs a staff of three full-time regional coordinators. Regional coordinators deal directly with both the formal and non-formal educational sectors.

Working with the School System

Each of Florida's 67 school districts has an appointed district environmental education contact. In some large school districts, this is a full-time responsibility for an individual. In most districts, however, the science or social studies supervisor usually functions as the environmental education contact. In addition, many districts have contact persons in each school. The school contact might be a curriculum coordinator, assistant principal, or interested teacher. This network of regional coordinators, district contacts, and school contacts provides the essential two-way communication mechanism from the Department of Education to classroom teacher and, perhaps more importantly, vice versa.

The State University System has appointed environmental education coordinators at each of Florida's nine universities. These university coordinators work with school districts and the 28 public community colleges doing workshops and environmental programs. While post-secondary education in Florida has not developed as rapidly as the K-12 program, it is beginning to respond to public pressure and public needs. At the present time, an environmental education inventory and needs assessment is being conducted by the State University System and the results of this assessment will be used to implement new and innovative system-wide policies.

Working with Community Groups

Community involvement is essential to the survival of any environmental education program. Many of the strongest supporters of Florida's environmental education program are not connected with the formal educational structure. The Florida Federation of Garden Clubs, Florida Wildlife Federation, the Jaycees, and many other community-based groups possess the political knowledge and skill to effect environmental education where educators fail. And they are committed.

Two basic strategies have been effective with the non-formal sector. One strategy involves training community groups to function as school volunteers and work directly with schools and teachers. This implementation strategy has proven particularly successful in South Florida where a high percentage of the population consists of retirees.

By having community leaders working in the schools, new avenues of communication are established, important community-oriented projects accomplished, and people of diverse backgrounds and talents work toward common goals—a quality environment.

Another successful strategy involves training community groups to teach members of their own groups about various environmental concerns. For example, Girl Scout leaders can be easily trained to conduct activities that develop environmental sensitivity. The "spin-off" from training a handful of scout leaders can produce hundreds of small, troop-level, environmental sensitivity workshops. A more complete description of this approach to community environmental education is available in LaHart and Allen's (1976) summary. This strategy targets on persons outside the formal educational structure and effectively increases the base of support for environmental education.

Working with the Advisory Counsel

The State Environmental Education Advisory Council fulfills the need for program coordination. The twenty members of the Council were chosen by the Commissioner of Education and represent a cross section of both formal and non-formal educators concerned with the environment. For example, representatives from the State University System, public and private schools, teachers and students are represented on the Council. Community groups such as the Florida Wildlife Federation and the Florida Federation of Garden Clubs play important roles. Industrial leaders on the Council have provided considerable direction as well as "door openers" for sources of funds. In addition, the Council provides a vehicle to coordinate the environmental education efforts of other state agencies such as the Department of Environmental Regulation and the Department of Fish and Wildlife.

Florida's experience has shown that diversity is the key ingredient for a successful advisory council. By drawing Council members from many segments of society, the policy and direction of the Office of Environmental Education reflects the needs of that society. Diligent work to fulfill those needs has created a grassroots support for Florida's environmental education program. This support is reflected through an alert and innovative Legislature that has passed needed legislation three times without a dissenting vote.

CURRICULUM DEVELOPMENT

Florida's experience indicates that teacher involvement in curriculum projects is essential to their successful implementation. Because of this, many individual school districts and schools have developed their own environmental education curriculum and/or activity guides. Locally-focused environmental projects have been the most successful. Rural children have difficulty relating to the air and noise pollution problems of urban centers, but can become totally involved with water-quality problems related to agriculture. What works in one area of Florida may not work in other areas. Consequently, there are no state-produced environmental education curriculum guidelines; instead, the Office of Environmental Education commissioned and published a series of strategy papers and model activity guides.

Outstanding scholars in seven academic areas were asked to provide a strategy for using their particular discipline to teach about the environment. In addition, each scholar was asked to provide a model unit that would demonstrate how the strategy could be implemented. The authors presented a framework for teaching within an environmental context—in political science, health education, language and communication arts, art, science, math and social studies. These model materials were then distributed throughout Florida and put into the Educational Resources Information Clearinghouse (ERIC) System (LaHart and Tillis, 1974). The utility of these models is reflected by their popularity. The Office of Environmental Education has reprinted the guides three times in two years.

Curriculum development and implementation continue to be major thrusts in many schools and districts. The "back-to-basics" movement has provided a new challenge to environmental educators. Innovative teachers are responding by developing activities that teach skills in reading, language arts, and math while increasing environmental sensitivity and concern. Environmental education, as an alternative delivery system for basic skills, is just beginning to emerge.

THE MINI-GRANT PROGRAM

The Environmental Education Act of 1973 authorized a small grants program for the purpose of encouraging the development and implementation of environmental education programs in local school districts.

Each district school board and each principal, through the district school board, may submit a proposal designed to effectuate an exemplary environmental education project in the district or school. The proposals include a description of the proposed project, the number of teachers and students involved, an estimate of the cost, a plan for project evaluation, the number of years for which project is to be funded, and a plan for integrating the project into the general curriculum and the financial program of the district.

In the past four years, the Legislature has provided almost one million dollars to fund Florida's mini-grant program. Experience has led to substantial modifications. For example, the first year of the program only school districts were funded; the second year both districts and schools were eligible for mini-grants, and a third category—planning grants—was also added. Planning grants enabled schools to develop comprehensive plans for environmental education. The schools then submitted proposals to implement the plans the following year.

This third category evolved into what is now known as the priority area grants. This grant category allows school districts with expertise in environmental education to submit proposals for the development of new curriculum materials, programs, and activities focusing on state identified priorities. This category of funding is independent of funding in other areas. Priority area grants are for $10,000.

Priority areas for 1974-75 were energy education and secondary school social studies. In 1976-77, the Advisory Council designated Reading Skill Development and Environmental Studies relating to private enterprise economics as priorities.

Districts are eligible for up to $10,000 in mini-grants but no single proposal receives more than $5,000. Some school districts submit as many as five different proposals. Funding awards are based on the significance of the proposed activities in the district and the potential that the activities or products have as state-wide models. District proposals are funded for such needs as in-service teacher training, comprehensive planning, and supplementary curriculum material development.

School mini-grants have a maximum funding level of $3,000. Individual school principals, faculties, teachers, students, or consortia schools may submit mini-grant proposals. The school mini-grants are designed to encourage activities which use the school environment to teach basic educational skills. Typical school proposals focus on development of environmental study areas on campus, community problem solving skills, curriculum adaptation, or faculty in-service education.

Tables I and II show the distribution of mini-grants and mini-grant dollars. In keeping with the concept of mini, the average grant during the first four years of the program was about $1,760. The mini-grants provide seed money. A 1974 evaluation of the program indicated that the grant recipients were supplementing state dollars at a rate of four to one.

TABLE I

DISTRIBUTION OF MINI-GRANTS
1973-76*

YEAR	---DISTRICTS----		----SCHOOLS-----		-PRIORITY AREA--		-----TOTAL------	
	Submitted	Funded	Submitted	Funded	Submitted	Funded	Submitted	Funded
1973-74	58(46)	43(37)	N/A	N/A	N/A	N/A	58	43
1974-75	67(67)	61(46)	165	102	N/A	60**	232	223
1975-76	67(47)	38(30)	239(48)	82(39)	15(10)	6(6)	321	126
1976-77	43(31)	36(29)	193(43)	102(39)	20(19)	3(3)	256	141
Total	235	178	597	286	35	9	867	533

*Number in ( ) is the number of districts 61% Funded
**Planning grants

TABLE II

MINI-GRANT FUND DISTRIBUTION BY AREA

YEAR	DISTRICTS	SCHOOLS	PRIORITY AREA	TOTAL
1973-74	$ 70,000	$ N/A	$ N/A	$ 70,000
1974-75	160,000	117,000	18,000	297,000
1975-76	132,400	127,400	40,000	300,000
1976-77	111,200	136,450	23,304	270,954
Totals	$473,600	$380,850	$81,504	$937,954

TEACHER EDUCATION

Training teachers to present environmental concepts throughout the fragmented disciplines traditionally found in education institutions is a major problem in creating a true interdisciplinary environmental education program. The faculty must develop sensitive environmental attitudes before the job of changing student attitudes can begin. In-service workshops are one method of developing these essential environmental attitudes.

In-service teacher workshops in environmental education are common but time consuming and, in terms of the total teaching community, ineffective. In Florida alone, it would take 15 years of sponsoring weekly workshops to reach our 88,000 public school teachers. Trained environmental educators and the necessary funds to reduce this time are not available.

The immediate need for a systematic, coordinated approach to provide information and technical assistance to effect a positive environmental education training program, without money, led to the development of the teachers-teaching-teachers plan.

Teachers are educators and all educators must play a role in an effective interdisciplinary environmental education program. By teaching teachers to teach other teachers, a multiplier effect is achieved. This plan not only calls for the traditional environmental education sequence of developing awareness, sensitivity, understanding, and motivating social action, but also provides teachers with the methods of holding similar workshops by involving them in planning, conducting, and evaluating these workshops.

The low cost, speed, and effectiveness of the program make it even more attractive to educators who are faced with the gigantic task of implementing environmental education. A more complete description of the teachers-teaching-teachers concept is available in Tillis and LaHart (1974).

Since the concept was first introduced to Florida's environmental education program, approximately 20,000 teachers have participated in one or more environmental education workshops.

Unfortunately, most pre-service teacher education programs have not adopted environmental education as part of the curriculum. A special task force of the State Advisory Council is exploring possible methods of including environmental education as part of the requirements in teacher preparation programs.

STUDENT PROGRAMS

Involving students in environmental education has been successfully accomplished through two innovative programs. The National Park Service's "Students Toward Environmental Participation" (STEP) program has involved thousands of students throughout Florida.

STEP members are high school students who:

1. Are environmentally aware of the wholeness of the earth, who understand the interdependence of all living things, and who can relate to nature in a personal manner;
2. Are personally committed to the redemption of the environment, both human and natural;
3. Prove their own commitment by communicating environmental awareness to younger children and to their peers and elders.

A state-wide STEP Training Conference was held at Camp Weed near Tallahassee in March, 1974. This conference trained 50 high school students from the five most populated regions of Florida. Students were selected on the condition that they would return to their regions and host at least two regional STEP training conferences. Since this initial conference, STEP programs have taken root in several school districts. These programs are operated by students and provide a meaningful example of continuing commitment.

The basic philosophy of STEP is one of communicating environmental sensitivity and awareness. The Florida version of STEP involves high school students "adopting" an elementary school or an elementary classroom. The students then attempt to teach the younger children about the environment. A series of games, activities, and plays provide the vehicle for developing the "STEP feeling" about the environment. While the organization and actual functioning of STEP varies from school to school, the basic objective of students teaching students remains consistent throughout the program.

Another successful student program is the state-wide organization of secondary school ecology clubs, OIKOS. A group of students felt a need to have an umbrella organization to exchange environmental program ideas between schools. After considerable correspondence and organizational meetings, OIKOS (from the Greek meaning home) became a Florida reality. OIKOS lends the strength of numbers to the many high school ecology clubs and fulfills a vital communication need between peers. STEP has been designated the official educational program of OIKOS, effectively tying the two programs together and strengthening the commitments of each.

The Florida environmental education story is as complex as it is beautiful. There has been a substantial commitment of state funds for administration and program operation for seven years. This state commitment reflects the enormous citizen support for the program. Perhaps a brief summation of the key elements of this citizen support in the approximate order of their development will be helpful to the reader.

The program began with years of dedicated effort by conservation and environmental organizations to encourage state and local government to begin sincere environmental education efforts. These early efforts were often political actions but were matched by volunteer efforts at the classroom level. Soon the emerging program allowed the Department of Education to communicate to teachers the contributions they could make, both to Florida's environmental needs and to improving basic skills. This started the "grassroots" action. Gradually, Florida's industries recognized that their own, quite expensive, environmental education efforts could be more effective when coordinated with the state program. Fortunately, the heads of Florida's state environmental agencies were convinced of the value of environmental education. They could see that schools could help implement their programs.

Their commitment meant that environmental education became a task for all of Florida's government.

The one key element which motivated and guided these developments was the State Advisory Council for Environmental Education. This Council, made up of dedicated state leaders who are committed to environmental education, continues to be the primary source of ideas and stimulus for development of the Florida state environmental education program.

APPENDIX I - THE ENVIRONMENTAL EDUCATION ACT OF 1973

(1) This section shall be known and may be cited as the "Florida Environmental Education Act of 1973."

(2) It is the purpose of this act to stimulate among students, teachers, and administrators a new awareness of man's relationship to his environments, an increased comprehension of his environments, and an increased ability to utilize the tools of society to solve environmental problems. To achieve this purpose, the Department of Education shall foster the development and dissemination of educational activities and materials which will assist Florida students, teachers, and administrators in the perception, appreciation, and understanding of environmental principles and problems, and in the identification and evaluation of possible alternative solutions to these problems and assessment of their benefits and risks.

(3) There is hereby created an environmental education program for the state educational system. To administer this program, there is hereby created an Office of Environmental Education in the Office of the Deputy Commissioner for Education Management. Responsibility for the administration of the environmental education program shall rest with the Department of Education, and the administration of the program shall be pursuant to rules and regulations adopted by the State Board of Education. In developing the environmental education program, the office shall have the power and duties of:

(a) Coordinating the efforts of various disciplines within the educational system and coordinating the activities of the various divisions of the Department of Education that are concerned with environmental education.

(b) Assembling, developing, and distributing instructional materials for use in environmental education, with special concern being given to the urban environment.

(c) Developing programs for in-service and pre-service teacher training in environmental education.

(d) Coordinating and assisting the efforts of private organizations and governmental agencies that are concerned with environmental education.

(e) Integrating environmental education into the general curriculum of all public school grades.

(f) Developing an estimate of manpower needs in government, science, and industry relative to environmental protection. The estimate shall be revised annually and distributed to the senior high schools, community colleges, and colleges and universities within the state. The office shall review the adequacy of existing educational and training programs to respond to the estimated manpower needs and annually report to the commissioner and the Legislature regarding the adequacy of such programs. The State Manpower Services Council is authorized and directed to provide such technical assistance as is necessary for the development and revision of the manpower needs estimate and for the review of educational and training programs as described herein.

(4) Pursuant to policies and regulations to be adopted by the Commissioner of Education, each district school board, and each school principal through the district school board, may submit to the commissioner a proposed program designed to effectuate an exemplary environmental education project in the district or school. The proposal shall include a statement of the nature of the environmental education project proposed, the number of teachers and students to be involved, an estimate of the cost, a plan for evaluation of the project, the number of years for which the project is to be funded, a plan for integration of the project into the general curricular and financial program of the district at the end of the funded term of years, and such other information as the commissioner shall by regulation require.

(a) Upon request of a district school board or any school principal, the [1](Office) of Environmental Education shall provide such technical assistance as is necessary to develop and submit a proposed program for environmental education. The [1](office) may use its own staff or such other consultants as may be necessary to accomplish this purpose.

(b) The commissioner shall review and approve, disapprove, or resubmit for modification all proposed environmental education programs submitted. For those programs approved, the commissioner shall authorize distribution of funds equal to the cost of the program from funds appropriated to the Department of Education for environmental education purposes.

(5) The commissioner shall, at least 30 days prior to the 1974 session of the Legislature, transmit to members of the State Board of Education, the President of the Senate, the Speaker of the House of Representatives, and the chairmen of the Senate and House committees on education a statement of the overall environmental education program, criteria for approval of proposed programs or projects, and the recommended level of funding for the overall program during fiscal year 1974-75. Each year thereafter the commissioner shall transmit to the above-named parties an appraisal of the programs or projects funded under subsection (4) and of the overall environmental education program as to the effectiveness, efficiency, and utilization of resources, including therewith a statement of the overall environmental education program for the coming fiscal year, the recommended level of funding for that year, and any other recommendations deemed by the commissioner to be appropriate.

(6)(a) The commissioner shall appoint an Environmental Education Advisory Council consisting of 20 members to include persons from the public and private sector, with due regard to their interest, knowledge, and experience in academic, scientific, medical, legal, resource conservation and management, urban and regional planning, population dynamics, and information media activities as they relate to society and its effect upon our environment. Each member shall be appointed for a period of one year. Members shall be eligible for reappointment. The membership may change from time to time as deemed appropriate by the commissioner.

(b) As soon as practicable, following appointment of the initial members of the advisory council, the commissioner shall call an organizational meeting of the council. From among its members, the council shall elect a chairman who shall preside over meetings of the council and perform any other duties directed by the council or required by its duly adopted policies or operating procedures. The council shall also perform the following duties and responsibilities:

(1) Provide a channel for inventorying, reviewing, motivating, and supporting environmental education.

(2) Formulate and recommend state-wide policies in environmental education.

(c) Members of the advisory council shall be entitled to receive per diem and expenses for travel as provided in s. 112.061 while carrying out official business of the council.

(d) Per diem and travel expenses as provided in paragraph (c) shall be paid from the funds provided to the [1](Office) of Environmental Education.

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[1] Note: Word in parenthesis was substituted for the word "Bureau" by the editors.

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ENVIRONMENTAL EDUCATION IN THE MOBILE COUNTY PUBLIC SCHOOLS

by Michael A. Magnoli*

Most of the programs analyzed in this book had their inception a half-dozen or more years ago, and their lessons learned have begun to permeate around the country. A new program in the public schools of Mobile, Alabama, reflects insights gained from earlier efforts elsewhere. Begun in 1974-75, courtesy of one of those ubiquitous Title III grants, the Mobile program is characterized by (1) a conviction that environmental education must move beyond nature study to confront pupils with issues and options, (2) involvement of all teachers after suitable in-service training, (3) incorporation of key environmental education concepts in all subject matter at all grade levels, (4) a core staff of specialists backed up by a materials resource center, (5) an implementation process plan, (6) built-in evaluation and dissemination, (7) a mechanism for involving community agencies, (8) concern for handicapped students, (9) a procedure for translating pupil awareness into pupil involvement in environmental affairs, and (10) an eye to sources of sustained funding. If Mobile doesn't make it, we'll have to rewrite the manual.

Due to such recent national and international developments as fuel shortages, soaring gasoline prices, contaminated drinking water, polluted air, and the depletion of non-renewable resources, educators have come to realize the need for introducing students to relevant concepts directly related to environmental issues. Thus, environmental education has developed as a process by which students are exposed to the types of factual and unbiased information that they need to become "environmentally literate citizens" capable of making wise decisions.

Mobile educators have long recognized the need for such a process in their schools. As early as 1965, a 640-acre section of school property was set aside specifically for the study of the "environment". At that time, most people considered environmental education to be synonymous with outdoor studies and ecology. Limited use of this land for nature field trips and a few classroom activities, initiated by individual teachers, constituted the whole of Mobile County's emphasis on environmental studies until approximately 1973. Then, steps were taken to develop a more comprehensive program by the

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selection of teachers and administrators to serve on an Environmental Education Curriculum Standing Committee. This committee was assigned the tasks of defining the nature, scope, and general direction of a comprehensive Environmental Education program, and considering possible funding sources.

As a result of the work of this committee and several other school board personnel, the Mobile County Public School System received a federal grant under Title III of the Elementary and Secondary Education Act for the 1974-75 school year. The resources of this federal grant (which continues through the 1976-77 school year) have been combined with financial commitments by the Mobile County Board of School Commissioners to provide a two-fold approach to environmental studies - development of classroom materials and development of an Environmental Education Center. The first part of this approach includes the writing, piloting, and implementation of classroom activities in all of the areas of environmental education such as energy, population dynamics, economics, etc. The second phase of the program involves the development and utilization of the Environmental Education Center, to serve as the hub for a wide variety of socio-cultural and bio-physical studies.

DEVELOPMENT OF CLASSROOM MATERIALS

The philosophy of Mobile County's program is built on the belief that the main goal of environmental education should be to nurture new attitudes and values so that man can live more harmoniously with his environment. The project staff, like all educators, has seen federal projects come and go, leaving little in the way of lasting impressions. Therefore, it was felt that the best way to produce the desired long-range effects was to integrate environmental education into such time-tested disciplines as language arts, social studies, mathematics, and science. If our environment does indeed affect every area of our lives, then environmental studies must pervade every area of the educational process.

During the 1976-77 school year, the project is involved in developing conceptually-based environmental education curriculum materials at all grade levels. The first step in this process, the review and evaluation of hundreds of existing curriculum guides being used throughout the country, was conducted during the 1974-75 school year. Teachers and supervisory personnel were involved in efforts directed toward identifying those environmental education concepts which should be introduced to students in grades K-12. As a result of this work, a composite of approximately 350 concepts has been developed, and is now available for use in "needs analysis" by other school systems. The environmental education staff and classroom teachers have utilized these concepts to construct classroom activities tailored to the needs and resources of the Mobile County Public School System. Students, teachers, school administrators, and community representatives are assisting in field testing and evaluating the materials. This effort will take most of the 1976-77 year. It is anticipated that the preliminary materials will be refined and ready for system-wide implementation at the beginning of the 1977 school year.

The principal rationale for this approach is derived from the belief that by incorporating environmental education concepts into the on-going curriculum, several benefits will be derived. First of all, the continuation of environmental education as part of the instructional program will be assured, and will no longer be contingent on continuing federal funds. Second, by incorporating environmental education concepts at appropriate places in each area of study, environmental education does not become a specific entity or course that should be taught at a certain grade level. Rather, students are introduced to environmental materials at all grade levels, and in almost all subject areas in a subtle, but reinforcing, manner. Thirdly, by allowing teachers to introduce environmental concepts within the framework of the courses they are already teaching, their confidence in themselves and the material is maintained, and the need for extensive teacher in-service training is kept to a minimum.

In addition to the actual development of curriculum materials, several other benefits will be derived. These include:

1. the development of an environmental education materials center,
2. the availability of technical assistance from the environmental education staff,
3. the development of an implementation process model for other school systems.

Each of these items is discussed in more detail below.

1. Environmental Education Materials Resource Center

In order to provide environmental education support services in the Mobile School System and to external entities, the staff operates an extensive materials resource center. Documents in the center serve as a data base for all types of program planning. Materials include an expertise referral list composed of persons, firms, organizations, and agencies where a particular knowledge and/or capability exists in specific areas of environmental concern. This is used to help put those interested in developing environmental education programs in touch with others who have on-going programs or similar interests. It allows individuals or groups to share information, pool resources, and initiate more innovative programs.

In addition, the center contains environmental education materials acquired from private and public agencies throughout the United States. Examples include state environmental education master plans, model curriculum guides, enrichment materials (games, puzzles, booklets, etc.), plans for developing outdoor study areas or school sites, plans for developing physical facilities for conducting environmental studies, copies of environmental education grant proposals, film and equipment catalogs, information on funding sources, and model program descriptions.

The broad range of materials within the center allows the staff to serve (a) local public schools and other educational institutions, (b) state and local resource management agencies, (c) businesses and industries, and (d) citizens or private groups which make specific request for program assistance.

The resource materials center is available for use by teachers throughout Mobile County, and by other teachers on a time and space available basis. The approximately 3000 entries have all been coded by subject area, and an information retrieval system has been developed so that teachers can locate the materials they need with maximum efficiency. Selected documents can be checked out by school administrators, teachers, librarians, and students.

2. Technical Assistance Available From Environmental Education Staff

The Environmental Education staff performs services inside the school system and externally by planning, coordinating, and facilitating a wide variety of efforts in environmental education. Internally, the staff plans the overall system-wide program, develops program instructional materials, conducts teacher training programs, makes presentations, and assists with the evaluation of all on-going programs. Externally, the staff cooperates with such agencies as the Alabama Environmental Quality Association, higher education institutions, industries, civic groups, and other local, state, and federal organizations in the development of specific environmental education programs. In the process of developing such programs the team approach is used in working with the above entities in planning, implementation, and operation. This assures maximum interfacing between these organizations and the Mobile County Public School System. The staff assists a wide variety of educational agencies in the identification of major environmental/educational needs, resources, and alternative solutions.

The following list provides some indication as to the broad range of services available from the staff:

a. Participation in planning school or community environmental action projects such as recycling centers, car pooling programs, campus beautification projects, etc.

b. Participation on Environmental Education Advisory Councils with the Alabama State Department of Education, higher education institutions, etc.

c. Preparation of environmental education master plans, short-term and long-range planning documents, etc.

d. Preparation of environmental education grant proposals for submission to various funding sources.

e. Preparation of plans for educational facilities, such as school sites, environmental study areas, nature study areas, etc.

f. Preparation of environmental education legislation and State Department of Education courses of study.

g. Review, evaluation, and selection of environmental education learning materials such as textbooks, curriculum guides, audio-visuals, etc.

h. Planning, organizing, and participating in environmental education workshops, conferences, seminars, etc.

i. Designing specific environmental education programs for preservice and inservice teacher education, at the elementary, secondary, and higher education levels.

j. Designing specific environmental education learning activities, research projects, etc., for students, teachers, and citizens.

k. Developing communications and cooperative working relationships with educational institutions, organizations, and groups concerned with environmental education both internal and external to Mobile County.

l. Developing curriculum guides, audio-visual aids and exhibits for facilitating environmental education, when such entities are not available on the commercial market.

m. Identifying funding sources, appropriate resource people, and facilities for the implementation of environmental education projects within Mobile County.

3. Development of an Implementation Process Model

As indicated earlier, the curriculum development portion of this project is funded under an ESEA, Title III grant. With the understanding that Title III projects should be innovative and exemplary, the project staff attempts to show that these materials can be utilized by other school systems in developing their own environmental education programs. Currently, materials are being made available to other school systems in Alabama and in other states for field testing. The formal evaluation and information feedback derived from this pilot process indicates the feasibility of utilizing these materials in a broad spectrum of school systems. If, indeed, other school systems can utilize the needs assessment instruments and the activities developed by this project, it stands to reason that the cost of implementing environmental education programs throughout the nation can be greatly reduced. The process model will provide a step-by-step procedure for analyzing a school system's needs, modifying curriculum materials to fit these needs, identifying resource personnel and materials, revising curriculum materials, and implementing the environmental education program.

DEVELOPMENT OF THE ENVIRONMENTAL EDUCATION CENTER

As stated previously, the second major portion of the program involves the development of the Environmental Education Center. As early as 1965, the Board of School Commissioners of Mobile County requested a survey of school lands to help select the best suited area for outdoor studies. At that time, neither the Board nor the community at large understood the far-reaching implications of environmental education. However, the far-sightedness of the Board led to the selection of the Halls Mill Section to be used as an outdoor learning center, now known as the Environmental Education Center. In 1970, a 19-acre lake was added to the property. Since that time, various task forces have provided general direction and specific technical assistance toward appropriate development and use of the Center. During the 1974-75 school year, a committee of educators proposed a developmental plan for the facility including its administration, its role in the instructional program, and the types of physical facilities that would be needed.

The Mobile County Public School System is extremely fortunate to have a single section of land with the diversity of natural habitats available at the Environmental Education Center. Some of these include a long leaf pine forest, a small pond with associated black gum trees, creeks, a small cypress swamp, a lake, marsh areas, and a variety of flowering and non-flowering plants. The various habitats lend themselves to a wide range of student and faculty studies. The animal populations of the area are also very diverse.

During the 1974-75 school year several facilities were added including an entrance road and parking area, four miles of nature trails complete with trail markers and species labels, restroom facilities with water fountains, and an amphitheater. During this same period of time, approximately 4000 students were provided with field trips to the Environmental Education Center.

During the 1975-76 school year, a portion of the Environmental Education staff again served as resource teachers to provide field trips to the Center. In addition, the staff served in a technical capacity to assist in the planning and development of additional facilities at the Center. The local school board has committed itself during the past year to the construction and development of the Environmental Education Center by appropriating $250,000 to provide an appropriate physical facility. The primary proposed structure is the instructional building, which will be the hub for all activities at the Center, and will contain space for both elementary and advanced laboratories, animal rooms, administrative offices, conference areas, student library facilities, project rooms, equipment storage, a dark room, and first aid rooms. The building is planned as a multi-purpose facility which can be used by students, faculty members, and community organizations. Other facilities which will be added include a maintenance building, an arboretum, additional nature trails, a weather station, fencing, signs and displays, a reptile pool, a greenhouse, and a pavilion.

As its facilities and capabilities are expanded, it is anticipated that, among other things, the Center will provide:

a. a way of strengthening the core science program at all grade levels, while providing a facility for on-site teacher training,

b. a facility where natural history displays can be maintained and other social science activities can be developed,

c. a vehicle for incorporating certain federally funded programs into the mainstream of the educational process,

d. a central facility for student and teacher research projects in such areas as horticulture, photography, water analysis, etc.,

e. a mechanism for involving all interested community agencies and other educational facilities in the instructional program of the Mobile County Public School System,

f. a mechanism for attracting additional federal money for supportive programs,

g. a way of providing handicapped students with new experiences through the use of hard surface trails, trails for the blind, etc.

SUMMARY

The Environmental Education Program of Mobile County is designed to be diverse, comprehensive, and multidisciplinary. If, indeed, the answer to our present and anticipated environmental problems is better education, then the Mobile County Public School System is moving on a variety of fronts to provide students with the types of information necessary to become environmentally literate citizens, and to provide them with the motivation necessary to become actively involved in solving these problems.

THE MIAMI-DADE COMMUNITY COLLEGE MAN AND ENVIRONMENT TELEVISION LEARNING SYSTEM*

by Robert H. McCabe
and Franklin Bouwsma**

A striking recent phenomenon on the post-secondary educational scene has been the growth of that type of institution variously known as community college, junior college, two-year technical institute, or vocational-technical school. To fill the interstices between high schools and four-year colleges, the community college by whatever name has brought a new dimension to American education. Its energetic flourishing coincided with the arrival of the environmental age, so it is not surprising that various forms of environmental education have taken root and grown vigorously in community college greenhouses. Leading lights in that development have been the authors of this case study.

Robert H. McCabe and Franklin Bouwsma brought to the environmental education movement keen senses of the creeping degradation on view on every hand in the Miami, Florida area, backgrounds in economics that suggested that environmental management was nothing but good business, strategic positions as community college executives, the ability to attract and hold able talent, feelings for multi-media approaches, and a pipeline to Washington. Their two-volume Man and Environment materials became the focus for wide-ranging model environmental education activities on the part of their own community college and its sister institutions around the country. As the founder and first president of the National Association for Environmental Education, Dr. McCabe has had a profound impact on the course of environmental education. In this case study they tell the Miami-Dade story with fitting modesty.

The Man and Environment television learning system developed by Miami-Dade Community College was based on a curriculum developed by representatives of more than 25 colleges throughout the United States. The curriculum is problem-centered and is developed around a series of principal concepts. It is interdisciplinary, as consideration of environmental problems dictate multi-disciplinary consideration.

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The curriculum was developed in a modular format with each module or unit of study standing as an independent unit rather than as a step in a sequential curriculum. The modular design allows the faculties utilizing the curriculum to select those they believe are most valuable for their own students. The faculty also has the opportunity to add new modules to the curriculum. This modular interdisciplinary curriculum was designed to be appropriate to college freshmen or to the general adult public, the difference being the depth of study and the depth of understanding required for successful completion. Such a curriculum was ideal for a television-based learning system as developed by Miami-Dade Community College.

The Comprehensive Learning System

Miami-Dade Community College is concerned with the deterioration of the environment and its impact on the quality of life. In response to this concern, a number of programs were undertaken to contribute to improvement of conditions. These included specific training for environmental technicians, action-oriented student groups working on the campus and in the community, and staff participation in projects relating to environmental quality. However, it was decided that the most important thing the college could do was to help to build a substantial base of citizens who understand environmental concepts and who would be motivated to participate in decisions concerning the environment—from those involving individual lifestyles to the setting of national priorities. One method of implementing this was the development of the Man and Environment television learning system.

The twin objectives of the program were to develop a learning delivery system that could serve students while remote from the college campus and to provide educational experiences concerning the environment that would be appropriate for the general adult public. The overriding goal, however, was to develop an understanding of environmental concepts among a broad population base to develop public support and understanding for rational decisions concerning the environment.

The curriculum of the television-based learning system was designed for national use: 1) to bring a quality program concerning environmental concepts to the broadest possible adult audience; and 2) to generate the large student enrollment required by the basic economics of the project. An enrollment of 20,000 students was required to distribute the substantial cost of development on a per-student basis that would deliver the course at a cost benefit over traditional instructional arrangements.

The Man and Environment Curriculum Guide was determined to be ideal as the basis for development of the television program, since colleges throughout America and the U.S. Office of Education had participated in its development. Thus, the curriculum already had national acceptance. During the preparation of the Man and Environment curriculum, it was recognized that there would be differences about the units of study considered important. Therefore, the learning system was designed on a modular basis to allow faculty to reject modules not considered important and to add modules of their own. It also allowed great flexibility since 15 modules could be selected for a one-semester course from the 30-module, two-semester program. Where a separate environmental course was not taught, individual modules could be utilized in other courses. The flexibility of the system has proven to be valuable, since many institutions are using the materials in ways that had not been anticipated.

The basic comprehensive system was designed for both college freshmen and the general adult public. Materials are organized to enable the regular students to study each module in greater depth than would be necessary for the general adult students. However, each module is appropriate for both groups. The system includes a documentary telecast and a television panel program for each module, an open-circuit radio program, a computerized instructional management system, a study guide and a textbook, all integrated into a comprehensive learning system.

The Components of the System

A. Television Documentaries. The television documentaries are the common element for all uses of the learning system. Each documentary is a thirty-minute color production of broadcast quality. There are thirty documentaries available for the two-semester course, one for each module included in the Man and Environment curriculum and publications. The objective of each documentary is to introduce four to six principal concepts and to motivate the student's indepth exploration of the concepts through the other elements of the learning system. The documentaries were designed to have impact on the affective domain of the viewer. They are fast-paced and utilize extensive national and international film footage, animation and other techniques.

The development of each telecast was preceded by a careful study of the description of the appropriate unit in the national curriculum guide, the textbook, and the related study guide materials. One or more faculty members and a television producer were then assigned to prepare a script for the program. The scripts were evaluated for accuracy, authenticity, and approach by a panel of distinguished environmental professionals from throughout the United States. These experts in academic and environmental fields joined efforts with the Miami-Dade Community College instructional staff, the media production staff, and a student committee in the evaluation process. The resulting scripts were strengthened by the diversity of talents which merged to create them. After final script agreement the media staff, writers, producers, artists, photographers, film editors, animators, sound and effect technicians, set designers and television engineers produced the telecast. Photographing and interviewing were done throughout the United States and other countries. Each documentary was then reviewed by the original academic panel and suggested changes were made prior to release.

B. Television Forum. Each module of study has an accompanying second telecast. It consists of a color video tape of a thirty-minute panel discussion on the module. These discussions have been carefully designed to complement the documentary.

The panel is composed of experts on the particular module under consideration. A moderator directs criticism and analyses of the material presented in the documentary and the textbook and solicits opinions and additional related information from panel members. The panel discussion centers on the expansion and clarification of the basic concepts of the module. It may introduce new material, explain any obscure point, and amplify the contents of the documentary.

Although the panel members are primarily college and university professors, they are supplemented by discerning students, environmental authorities, scientists, and representatives of government, industry, conservation organizations and others. The dialogue among panelists is frequently spirited and almost always illuminating. In this element of the system, concepts under consideration are related to the local community. Thus, the colleges using the system often produce their own forum programs.

C. Radio Forum. Immediately following each telecast, faculty members take part in a live radio program called Ecoline. By telephone, students can call the professors on an open microphone program. They may discuss the module under consideration, ask questions of or participate in a dialogue with faculty or with other students who may have called in. On an immediate basis, the radio program provides information regarding a course usually garnered by non-verbal and expressed-verbal cues in a classroom. It also affords an invaluable direct human link and identity for students. As in other "open-mike" radio programs, a five-second mechanical delay is used as a safeguard against libel or profanity.

Experience indicates that students are less inhibited in questions or statements of viewpoint expressed from the privacy of their homes than in a classroom. The fact that their ideas receive far wider circulation than in a conventional classroom has appeal for some students, and provides a problem for the moderator in not allowing the same students to dominate the program. Students have participated enthusiastically in the radio forum.

D. Computerized Instructional Management System. Most of the students registered in the Man and Environment courses do not come to the campuses of the colleges. It was essential that a system be developed to monitor each student's progress and to provide appropriate individualized assignments and reports. Thus, RSVP was developed. RSVP (Response System With Variable Prescriptions) is a computerized instructional management system developed by Miami-Dade Community College to assist faculty members in their efforts to personalize and individualize instruction and increase their teaching effectiveness.

RSVP is based on a blend of classroom methods with computer technology to enable an instructor to use quizzes or tests as a means for individualizing instruction. RSVP enables the instructor to share knowledge of resources for clarification or illustration, or to recommend specific activities for correction of misconceptions with each student. Students can be provided with a personalized message from the instructor regarding their performance and be admonished, encouraged, or congratulated without the time consumption necessitated by individual meetings with each student.

Traditionally, tests have provided instructors the means to distinguish levels of student achievement as a basis for grade assigning. Similarly, in somewhat different settings, testing provides a diagnosis of strengths and weaknesses and a basis for prescriptions for remediation. Prescriptive response to diagnosis can, in turn, lead to improvement in an evaluative test score, and in succession to a higher measured level of achievement. Qualitative levels to learning improve through the use of a prescriptive system. Hence, by combining the diagnostic and evaluative functions of testing in an instructional setting, student achievement improves.

Students receive surveys composed of criterion reference questions which are answered at home by "mark-sense" cards. The cards are mailed to the college for scoring. The computer prints out a report informing the student of his progress, the number of concepts for which he has demonstrated mastery and the concepts which he has not completed successfully.

The faculty has developed assignments for each module to aid students who have not demonstrated mastery. The appropriate assignments are printed by the computer on the report to each student. For more sophisticated users of the system, more complex and individualized assignments can be prepared. The assignments can be based on student attributes—different students may receive different assignments concerning the same concept. For example, students who come to campus to take other courses might be given an assignment in the campus library while other students who do not have access to the library would be given different assignments. The system will also provide varying assignments depending on the number of concepts a student has mastered. A student who consistently masters all of the concepts would be given assignments to go into greater depth in future modules. A student missing many concepts could be given a message to call a professor at a designated phone number so that consultation could be arranged.

Although RSVP surveys are not scored as a basis for assigning final grades, additional reports are provided to the instructional staff indicating the progress that each student is making, and the progress of all the students taking the course as compared to the students who have taken the course previously. This information is particularly helpful for evaluating the success of the system. It indicates concepts which are presenting the greatest difficulty to students. As a result, the instructional staff can determine which elements of the system require revision to improve the quality of learning.

Messages are also sent to students through the RSVP system. Students might be informed of a hearing concerning air quality, a lecture being presented on campus, or examination and registration information. The principal limitation on the quality of RSVP is the creative abilities of the instructional staff in designing criterion reference questions which accurately measure understanding and in creating meaningful assignments for each concept in each module.

Assistance from the computer makes it possible for the faculty to monitor the progress of each student, maintain course records, and provide individualized feedback to students. It also assists in determining course content areas which may need clarification, re-teaching, or review. The burden of paperwork needed for individualization is lifted from the instructor, yet he is able to reach each student with a specific assignment, based on test or survey results. The student may then capitalize on explicit directions to improve his or her chances for success due to reviewing the personalized direction needed to improve course content areas capabilities. Prescriptions may be tailored to fit both individual characteristics and general needs for academic guidance. Filmstrips, audio-tapes, films, video-tapes, conferences, and additional reading materials are some of the materials and activities to which prescriptions may refer. With RSVP then, tests are no longer a device useful only to grade students, but become diagnostic tools, by which instruction may be prescribed for individual students.

E. The Study Guide. The Man and Environment Study Guide provides direction for the use of the system, assignments, references, vocabulary and suggestions for self-evaluation. It includes a brief overview of all the materials to be presented on each module, an outline of the TV documentary, directions on how to watch the programs to get the most out of them, assignments for each module, and directions on how to get additional help or find additional materials. It is not intended as supplementary learning material, but as the title indicates, a guide for study.

F. The Textbook. Textbooks have been developed to support the national curriculum that was the basis for the development of the television learning system. The two-volume Man and Environment basic text covers the same modules as the television system and emphasizes the same major concepts. As the other materials in the system, it is modular with each chapter independent of the others. Thus, it allows the faculty at each institution to select the units or chapters that they consider the most important and most interesting.

Patterns of Utilization

The Miami-Dade Community College television learning system for environmental education was designed as a general education course for college freshmen and as a continuing education course for the general adult population. The materials were designed in a modular form to allow individual communities and colleges to select from the total of thirty modules in order to design a course that is most appropriate for that particular institution or community. This flexibility allows both the selection of modules and the addition of others of social interest to the particular professional staff working with the program.

The basic design is the use of an open-circuit telecast with three audiences: 1) a casual audience—those who tune in to the telecasts but do not register for course credit; 2) general adult students who are required to do a small amount of work with print materials; and (3) college credit students. This basic arrangement was presented in thirty major American cities in the fall of 1973. In some of these cities, the credit enrollment alone was as high as 1000 with estimates of at least ten times that many in the category of "casual viewer". The course is being utilized in many ways in addition to the basic design:

A. Prisoners. There has been increased interest in recent years in the education of inmates of correctional institutions. A number of attempts are being made to provide opportunities for environmental education for such individuals. Both in Miami and in the State of New Jersey, inmates in the correctional institutions have an opportunity to take the Man and Environment television learning program. This is an obvious example of an appropriate learning delivery system for persons who are restricted in their ability to come to a campus.

B. Public Officials. The work of many public employees has impact on the environment, therefore, considerable effort is underway in Miami and in other cities to induce public employees to take the Man and Environment college credit program. In most instances, it is being planned as an incentive for salary increases or promotion.

C. On-Campus Utilization. A number of colleges are using the Man and Environment program series on their campuses. The programs are presented in video cassettes. Students proceed through the units at their own pace, checking out cassettes as they are ready for a particular unit, and utilizing the RSVP system for feedback on progress. RSVP is utilized to indicate when the student has successfully completed a module of study and can proceed to the next module.

D. High School Program. The State of Arkansas has purchased the Man and Environment documentary telecasts, has written new print materials appropriate for high school students and is offering the program throughout that state.

The use of the program materials has been sufficient to support the high quality and high cost of development and to achieve the major goal of spreading an understanding of basic environmental concepts to a substantial population base. It seems a realistic estimate that over a million persons will have taken the course in one mode or another within the next three years.

PROJECT LEARNING TREE

by June McSwain*

The resource industries have been into conservation education for many years via all manner of institutional advertisements, films, and manuals. While many of their messages admittedly were self-serving, the fact that contour plowing is a well-understood symbol of soil conservation is a tribute in part to the effectiveness of the campaigns of farm implement manufacturers. However, the population-pollution-pesticide era caught industry as a whole off base. An early issue of Environment Monthly was devoted to "the pitiful environmental showing of the public relations profession." Today, while business and industry in general cannot be said to have become the white hats of environmentalism, a recent issue of Environment Monthly was able to recognize a half-dozen leaders "for making environmental excellence a basic condition in the pursuit of corporate goals." Among the very best early ecological primers were Kaiser Aluminum's Ecology: The Man-Made Planet and Bank of America's Getting Down to Earth.

Now along comes the American Forest Institute with a model approach. Not only has the forest industry turned over the task of developing classroom materials to classroom teachers, it has defied the laws of gravity by producing an unbiased environmental education guide. Of course the Project Learning Tree materials take as their point of departure the role of forests and forest industry in society, but the approach is multidisciplinary and rational. With luck other industries will follow the AFI.

Historically, the forest industries have provided an educational program on forest and forest products through their public relations and education organization, American Forest Institute (AFI), almost since its beginning in 1941. AFI is nonprofit and represents all segments of the industry—both those which grow and harvest trees, and those which manufacture lumber, paper, plywood and other forest products.

Through the years the educational program provided materials for students in grades four through twelve on forest and forest products. These were made available free of charge to teachers in classroom quantities. Most were developed by AFI staff with very little direction from educators.

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As student populations continued to grow, the industry advisory committee for the education program suggested that a more effective way to work with the education audience would be through teachers, including those in kindergarten through grade twelve. With this direction, new items were developed in cooperation with filmstrip companies and teacher magazines.

As this change in the course of AFI's education program was taking place, environmental education as an area of study was beginning to grow.

In light of this trend, even with the addition of new items, however, AFI's program was not comprehensive. It continued to deal mostly in facts about the forests and forest products with very little relationship to the social, political and economic areas of environmental education. Nothing was included on attitudes, values and decision-making skills.

Part of the responsibility for AFI's education program includes participation in education organizations to be alert to trends in education and to become acquainted with those in the education field. During a meeting of the Western Regional Environmental Education Council (WREEC), AFI became aware of a supplementary curriculum program entitled Energy and Man's Environment. This had been developed through WREEC membership, which consists of the state department of education environmental education coordinator and the representative in the state's resource management agency from thirteen western states. (See WREEC case study, pp. 274 ff.)

AFI saw in this model an opportunity for using forests, forest management and land use as a basis for a similar environmental education program for grades kindergarten through twelve. Discussion began with WREEC regarding the possibility of a cooperative venture. AFI made a grant to WREEC ($80,015) for the development of a supplementary interdisciplinary curriculum for grades kindergarten through twelve. WREEC then subcontracted with a Seattle, Washington, educational consulting firm, Education/Research Systems, Inc. (E/RS), to manage the development of the program. The curriculum guides were to be completed in a year's time.

E/RS invited industry, government agency personnel and educators to a working session to develop the theme and structure of the program. The overall goal of the project was to provide industry with a program to reach the education audience that would develop an awareness of our interdependency with the forest, the use of its resources, and knowledge of the scientific, technological, social, aesthetic, and ethical factors relating to this interdependency.

Subsequent workshops were held in which the curriculum framework and teaching activities were developed. Education audience representatives included not only teachers but college professors, supervisors and superintendents. It was hoped that federal and state agencies, industry and conservation organizations, all providing resource background information, would give the program a more balanced, unbiased character.

The specific purpose of the program is for students:

- to expand their definition of the term "environment" to include all aspects of the cultural and natural worlds, and the relationships between them;
- to help them to become personally aware of their presence in the environment, their impact upon it and their responsibility for it;
- to develop within them a sensitivity to environmental matters, along with the ability and the confidence to take an active role in the regulation and management of the environment.

For teachers, the purposes are:

- to provide activities that are open-ended and encourage teacher-pupil creativity;
- to help in the development of skills in decision-making and problem-solving;
- to provide material readily adaptable to individual teaching styles and classroom situations;
- to supplement and enhance the existing curriculum with environmental education learning activities designed to develop attitudes, knowledge and skills relating to the forest as part of man's environment.

And to meet industry's objectives:

- to provide curriculum materials on forests, forest management, forest products and land use for the schools developed by those who would be using them—teachers, principals, superintendents, college professors;
- to provide an environmental education teaching tool more acceptable to educators since, rather than telling an industry story, it would encourage the exploration of differing points of view, breaking down the special interest barrier that tends to discourage education's use of industry materials.

The manuals were completed by February, 1975. The manuals (one for grades K-6, one for 7-12) provide over 100 activities to supplement the curriculum in social studies, science, mathematics, language arts and other areas. They are designed for classroom and out-of-doors work. The curriculum framework and concepts around which the activities were written are, of course, included in the manuals. An extensive bibliography is also provided with references keyed to the various lessons. A cross-reference index indicates lesson activities by subject area.

The industry was interested in an initial reaction from the education audience to what had become known as Project Learning Tree (PLT). Four workshops were held in the spring of 1975 to introduce a small number of teachers and administrators in Washington, Idaho, Wyoming and California to the project. The reaction was favorable and the program well received.

Educators' advice for implementing the project was to introduce it to teachers through workshops held in cooperation with the departments of education and coordinated by a special staff for the project. In addition, since the developmental process had included minimal testing, an outside agency should be found to develop and execute a classroom evaluation of the program. The industry advisory committee for AFI's education program recommended these suggestions be followed.

An advisory council to the project was established with three members from WREEC, three from industry and the AFI staff person responsible for the education program. WREEC representatives were supported in their work on the council through AFI funding for necessary travel.

Those involved on the council began the job of selecting a project director for PLT. A number of applications were received, screened and at one of its first meetings the council interviewed those who were best qualified. A selection was made.

The PLT staff consists of three: a three-quarter time project director, half-time implementation specialist and a three-quarter time administrative assistant. All are equally capable of, and involved in, facilitating workshops.

AFI's one-year contract for the staff is with the project director who is responsible for other members of the staff. The project director works under the direction of AFI and the project's advisory council.

The project director's responsibilities include: day-to-day implementing of PLT in the WREEC states taking part in the project; working with the states and evaluators on the procedure for the evaluation and selection of teachers to take part; assisting in revising and editing the manuals. The project director must provide a comprehensive report to AFI no later than December 31, 1976, assessing the success and impact of PLT. The budget provided by AFI under the contract covers salary, travel and office expenses and totals for the one-year period.

Members of WREEC were contacted regarding the workshop implementation funds available from AFI. These were based on the state's teacher population in relation to the total teacher population in the thirteen western states, at a per-teacher rate. Funds could be used for facilitators for the workshops, outside of PLT staff; transportation and meal costs for teachers; and substitute pay for teachers. Manuals were provided free of charge. In order to receive funding, states had to submit workshop plans to AFI for approval, outlining the general format and expenses for a workshop of at least one day.

Actual bookkeeping for the workshop at the state level is handled by a state organization or the state department of education. Payment is made to the state by AFI either prior to or after the workshops, depending upon state preference.

Ten of the thirteen states in WREEC elected to participate in the program. Teachers attending workshops in these ten states would be asked to volunteer for the formal evaluation or would be selected for participation by workshop facilitators. Grades 5, and 6, 8, 9, 10 and 11 were to be involved.

The advisory council for PLT received proposals for the formal evaluation of the project from several organizations. The council selected the Bureau of School Service and Research (BSSR), University of Washington, Seattle, as the contractor. The contract for the evaluation is between BSSR and AFI and covers approximately eleven months. The objective of the evaluation is, of course, to test the activities in the manuals with classroom students to determine if the activities reach the objectives set.

Since the total number of activities in the two guides exceeded 100, a core of lessons needed to be selected before instruments for the actual evaluation could be developed. Six were selected from the elementary guide and five from the secondary guide. Basically they covered all seven principles on which the activities were based, plus social studies, science and language arts subject areas, most skills with the exception of group participation, and different teaching modes. Environmental topics of the core lessons included land use, forest products, paper conservation, lifestyle and forest environment.

Teachers taking part in the evaluation would teach all core lessons for their respective grade levels between September and the middle of November. BSSR would mail the instruments, or tests, developed from the core lessons, with instructions for use, in mid-November. Tests were to be returned to BSSR by teachers in late November or early December. Results would be tabulated with the report due to AFI by December 31.

A booklet explaining the evaluation and asking for teacher reaction to the activities with suggestions for changes was developed by the PLT staff and sent to teachers prior to the material mailed by BSSR. The PLT staff coordinated the selection of teachers who were to compose the "treatment" group; BSSR was responsible for selecting a group of teachers who would become the "control" group. The character of the control group would be similar to the treatment group but smaller. These teachers, of course, had never seen or used PLT with their students, who would be given the same tests as students in the classes of "treatment" teachers.

The advisory council, PLT staff and others have worked with BSSR in the development of the instruments. These are being field tested before final printing and mailing to teachers.

At present forty teachers at the elementary level and twenty teachers at the secondary level are taking part as the treatment group in the evaluation. These teachers come from nine states taking part in the program and reach approximately 2000 students.

Scores from the post-tests administered to these students will be compared with scores from the same tests given the control group to determine the effectiveness of PLT.

The industry had funded PLT through a western organization, WREEC. Its goal, however, was the development of a national program.

Workshop plans from the western states and funding necessary for these were to be studied to select the most effective method for reaching teachers in a state, and thus spreading the program through a state's school system. To determine budgeting necessary for 1977, 1978 and beyond, cost was to be affixed to that plan based on workshop funding experience in the western states.

Since the evaluation of the project was not to be completed until December 31, 1976, and necessary revisions to the curriculum guides would have to be made after that date, the industry advisory committee to AFI's education program decided the program would continue to be offered in the ten western states through 1977 with AFI funding, depending upon AFI budget funds available. In addition, four states outside the west would be contacted to determine their interest in using the program in their states.

AFI's field staff is divided into five regions. One state in each of these regions, not including the west, would be selected by AFI staff and industry committees within a region to contact regarding the program.

From plans submitted by the ten western states, the following implementation procedure was developed for states not located in the west which would be participating in the program:

- a one-day meeting of a planning committee with the suggestion that it consist of one member of the PLT staff, the environmental education coordinator from the state department of education, personnel from the state resource agency, several other persons prominent in environmental education in the state and a member of the forest products industry. The committee would plan a date, time, and place for the workshop; a format; and method and responsibility for selection of workshop participants. The state department of education would have the basic responsibility for selection of workshop participants and providing one person to work as a facilitator for the workshop. The workshop could be two days, although AFI funding would cover only one day substitute pay.

- the workshop would include approximately 50 people—administrators, principals, superintendents, supervisors, and at least 30 teachers. Twenty of the teachers would be selected to put on workshops later in their own school districts. Hopefully, these would be located throughout the state. A small amount of funding would be available to each of these teachers for facilitators, transportation, facilities, or meals, etc. In addition, the state would have the option of a one-day workshop for these twenty people one, two or three months after the initial workshop to determine any problems they might have in implementing their own workshops or problems with the basic program which should be fed back to AFI. PLT manuals would be provided free of charge.

- a standard cost for this workshop is difficult to determine with the differences in substitute and transportation costs across the nation. From limited experience in 1976, state-by-state workshop costs vary according to workshop plans, substitute pay and transportation costs, from $10 per teacher to $45 per teacher. The average cost per teacher for all those involved in workshops is $16. The two-day workshop plan as budgeted should cost approximately $18 per teacher, not including the cost of the manuals.

The workshop plan to be offered to western states, since they have experienced the program for a year would be:

- a one-day workshop for approximately 20 teachers who would be capable of putting on a workshop in their own school districts. These workshops may include teachers who had attended workshops in 1976. A small amount of funding would be available to these teachers for workshops in their districts. Again, manuals are free of charge. Cost is anticipated to be around $14 per teacher, not including the price of the manuals.

Due to the variety of ways in which state department of education environmental education coordinators work within their states, these plans are being offered as suggested approaches. Modified plans can be submitted to AFI for approval. Workshop plans by teachers within school districts must be approved by the state coordinator and PLT staff. Funding is adjusted according to the size of the teacher population within the states.

Projected for 1978, AFI plans to fund two state workshops in each of three (AFI) regions, and one in New England. The western states will continue the program through various support methods: forest industry companies, self-support, state support. Plans are to reach approximately 3000 to 4000 teachers in 1978.

Obviously, as the program grows, manuals will continue to be revised and evaluation periodically made of the effectiveness of the program. PLT budget and PLT staff time have been arranged so PLT can be introduced in states outside those funded by AFI when opportunities arise. All that is needed is someone to facilitate the workshop who knows the program, and of course, a supply of the free curriculum guides.

The one problem which continually arises in working with the program is the difference between AFI/industry budgeting and planning on a calendar basis and the school year which runs from September to June, spanning that time period.

Cooperative programs with other environmental education organizations and agencies have worked favorably in the west and will offer another avenue of introduction for PLT nationwide.

As a link between participants in workshops, a newsletter is being prepared by the PLT staff on the project, focusing on what various teachers have found that works well and additional sources of information that might be helpful in carrying out the activities. The newsletter is provided free of charge to workshop participants.

Evaluation forms have been created and used with facilitators of workshops and voluntarily with those participating in workshops. A survey is planned to determine the effectiveness of the workshop in introducing teachers to the materials and the use of the activities by teachers. Suggestions will also be solicited for the revision of the manuals, now slated for completion in June, 1977.

It is difficult to keep a running total on the number of workshops and participants. However, there have been approximately fifty workshops with AFI funding. In addition, fifteen shorter presentations have been made to various groups. Over 1300 teachers have taken part in workshops; an additional 500 persons have been reached through presentations. The goal for 1976 was to reach 1000 teachers.

As the program has grown through the initial workshop implementation phase, additional objectives have been cited:

For teachers:

- to provide an opportunity for participation in workshops and other activities to enhance the effectiveness of the use of the program in the classroom.

And for industry:

- to provide material evaluated through classroom testing; to give industry an opportunity not to observe, but to participate and interact with teachers from their states in workshops centered around learning activities from Project Learning Tree;

- to provide an opportunity through workshop participation for industry to establish itself as an important link between the classroom and factual information on the forest resource, its management and use, at the local community and state levels;

- to provide an opportunity for working through the state departments of education and other appropriate agencies which offer expertise and access to the education community for a more effective and efficient program.

WASHINGTON ENVIRONMENTAL YARD (PROJECT WEY)

by Robin C. Moore and Herbert H. Wong*

For many years the conventional wisdom held that environmental education was what sixth graders did on a single trip to a rural woodlot, prairie, glade, or pond. Then emerged the idea that environmental education could perhaps better be imparted through continual exposure to urban school yard phenomena. This concept has been well elaborated at the Washington School Environmental Yard in Berkeley, California. Blending the disciplines of education, recreation, and landscape architecture, and involving community people and resources, the directors have created varied ecosystems in a circumscribed city open space to form a series of teaching-learning stations that have as their ultimate goal the inculcation of an interdisciplinary "fifth world" ethos attuned to an ecological life style and appropriate technology. As with so many pioneering ventures, the authors admit to being more honored abroad than at home.

SCOPE

Washington Environmental Yard (Project WEY) forms the nexus of an elementary school-neighborhood-community context in Berkeley, a university town of 128,000, bordering San Francisco Bay, a few miles from the Pacific Ocean. The total WEY community has two primary divisions:

- The children, teachers, parents and neighborhood residents who are physically involved in the Yard environment are defined as the "user community";
- People who have mentally participated in the project one way or another are defined as the "participant community" —local community leaders, city administrators, visitors from across the country and from foreign lands, correspondents, the readers of our publications, etc.

Locally, our on-going goal is to persuade mental participants to become users. By definition, regular users are assumed to be favorably disposed toward the project. On the other hand, not all participants are friends, but are distributed along a spectrum from positive "supporters"

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to negative "detractors", with neutral "spectators" somewhere around the mid-point. An on-going goal of the project, therefore, is to expand its social scope by persuading detractors and spectators to become supporters—or even users.

Many participants, however, can never be expected to become users, for reasons of geography, time or role context. Therefore periodic festivals, celebrations and rituals have been staged, aimed at bringing the user- and participant-communities together in face-to-face contact in the space to which they are all connected in various mental or physical ways. These special events have functioned as the highlight punctuation marks in the syndetic process described under "history" below.

PURPOSES

Since its inception, WEY has fulfilled the following needs and purposes, at one time or another:

1. Exemplified a process model of environmental education and design, whereby deliberate change to the material circumstances of a school site can: a) serve as a vehicle for the participation of school and community with each other, leading to an understanding of their mutual relationships; and b) promote environmental involvement by the individual, leading him or her to understand the material world and human interdependencies with it.

2. Enabled a People-Environment Action-Research and Development Project to demonstrate how urban school sites can be reconstructed to serve childhood, educational, recreational and neighborhood community purposes.

3. Given a demonstration of low-maintenance, drought-resistant landscaping techniques generally applicable to urban open space treatments.

4. Furnished a curriculum research and development situation focused on a) the generation of an alternative interdisciplinary curriculum, b) the publication of integrated curricular concepts and learning activities applicable to the total indoor-outdoor four-dimensional school site and environs, and c) the incorporation of the informal realm of childhood play into a comprehensive formal pedagogical framework.

5. Supported a research facility permitting the conduct of indepth investigations of children—environment relationships in a diverse, relatively controllable setting.

6. Provided a setting for pre-service and in-service training seminars and workshops for student teachers, teachers, administrators, professional designers, recreation leaders and community workers.

The form of the above statements imply the specific needs and objectives being fulfilled by the project. The underlying purpose is to exemplify that an apodictic (i.e., incontestable because it is demonstrated) radical reorientation in public education can be implanted in the early and middle years of childhood. The WEY concept recognizes children's innate affinity toward the material environment, both the natural and man-made elements of it. It recognizes children—environment interaction as the source of all intuitive knowledge—a source that provides powerful motivation force with which the artful skills of pedagogy can work creatively. To develop such intuitive ground water into wells of conscious understanding and awareness, an interdisciplinary doctrine has been the marriage partner of the WEY approach to Environmental Education. Thus children-environment interactions provide an integrated vehicle for the acquisition of basic skills which, in effect, have become the media for recording, representing and expressing environmental awareness and concept-building. Whether by word, numeral, classification, measurement, song, poetry, drawing, dance, gesture, meditation, etc., the full spectrum of quantitative to qualitative techniques has been spanned.

FUNDING: QUANTITY AND QUALITY

In relation to WEY's purposes, support falls into four broad functional areas:

a. "stuff money" for the purchase of physical resources or change elements to the site;

b. "people money" to support staff personnel in whatever has been the appropriate role at the time—research, documentation, teacher training, etc.

c. "supplies money" for the provision of documentation materials, tools and equipment, and

d. "publication money" to support the continuing dissemination effort.

Support for each of these areas has come in two different ways: grant funds and in-kind services. They have had a variable number of "strings" attached, defining whether the money was "hard" or "soft." It may appear to some that the best type of support is "soft grants," but this is not necessarily so. The disadvantage of soft money in-kind is that the results derived for it usually have a low profile and a short life. The advantage of soft money is the freedom to spend it where needed, with relatively less supervision. The disadvantage of hard money in-kind is the converse, requiring tighter supervision. Although they may often appear to cramp one's style, constraints also offer the chance of achieving more effective dissemination and higher levels of recognition or respect in the participant community. The directors of WEY have consistently attempted to diversify funding sources so that internal developmental needs could be balanced with the need for external recognition and dissemination.

WEY was launched with a (fortunately) "soft" planning and documentation grant ($10,000) from Educational Facilities Laboratory (EFL), New York. This amount was approximately matched with an equal, but (unfortunately) "harder" amount from the Berkeley Unified School District (BUSD) for physical development. During this initial period, in-kind support was provided by the Ortho-Division of Chevron Chemical Company for the publication of the green WEY Booklet (1972). The booklet was designed by a graduate student at the University of California as the basis of his Master's thesis in visual communication.

1972 was a very lean year; we limped along virtually without support, constantly threatened on all sides because of the project's slow progress and high vulnerability. In 1973 and for the two years following, physical development was supported by a series of thankfully soft grants from the California State Department of Education Office of Environmental Education, totalling $10,000 altogether. During this same period BUSD made some modest financial or in-kind contributions amounting to a few thousand dollars. However, the in-kind contributions from other Bay Area public agencies and private organizations were impressive. Many thousands of dollars-worth of service were donated to the project, most notably by the East Bay Regional Park District (EBRP), the Berkeley Parks Department, the Pacific Gas and Electric Company (PG&E) and the Chevron Chemical Company. Most of this contribution focused on site works (e.g., EBRP graded the site; PG&E helped install the irrigation system, etc.)

The provision of research support has had an equally checkered history. Basic documentation and monitoring was supported from 1972-76 by small annual amounts allocated to Professor Moore from the University of California (about $4000 in total). From this source a short film, Help Change this Yard!, was produced in 1973 with volunteer help from a community participant. The publication of Open Space Learning Place (Moore, 1973) was also made possible.

In the past five years WEY has been able to attract two substantial research and development grants. The first of these was a very "hard" amount from the U.C. School of Education for the development and validation of Environmental Learning Stations (ELS) for the two years 1973-75 ($22,000 in total).

The number and tautness of the strings attached to the ELS grant did not produce a satisfactory outcome. Unfortunately, the university-appointed Principal Investigator insisted on following his own academic preconceptions, rather than allowing the research design to be informed by prior on-site involvement. The "seed packet" of Environmental Education Activity Cards (1975) produced by the ELS project, although useful, are a pale reflection of the potential of WEY.

The second R and D grant has been more successful. It came from H.E.W., Office of Environmental Education ($32,109) for the 1975-76 school year and, at the time of this writing (September 1976) is in its terminal phase. The federal requirements attached to this money could be categorized as hard/soft. In one sense, it has been subdivided flexibly four ways, to support "stuff," people, supplies and publication. On the other hand, a product was a contracted expectation; thus a certain degree of healthy discipline has been required. The inherent flexibility of the grant unfortunately had been greatly curtailed by the administrative hardness—procedures that resulted from BUSD accounting inadequacies. Despite these external difficulties, a considerable number of production items are in process (see "Research" below).

Whereas in the early days we sought funding wherever we felt half a chance of success, for whatever purpose we could legitimately concoct (such is the nature of the game), we are now finding that one current round of requests are tied to specific, rationally justifiable, developmental, dissemination and research components. For example, pending applications include construction of a field house resource/instruction center; production of a comprehensive 16mm film; research focused on children-water relationships; state support of WEY to function as a regional early-childhood training/research/EE promotion center. Together with the American Institute of Architects, Chevron Chemical Company has provided salary and material support to enable the project directors to devote time to assembling two book manuscripts which are close to completion.

TARGET AUDIENCE

The growth and development of WEY has been an evolutionary process. Therefore, the term "target" must be used advisedly. WEY represents an aimable, deliverable concept only under certain circumstances and even then its effectiveness must always be subject to doubt.

From the point of view of the "user community," WEY is as much a part of them as they are of WEY. The "mental WEY" is an evolving relationship growing and developing in the individual mind and the communal spirit as "visible WEY" grows and develops on the ground. The perception of WEY and its current objective form are interdependent. Awareness, behavior and objective reality cannot be disengaged from each other, just as intertwined, interdisciplinary social and science curriculum strands may not be unraveled (although of course they can be intellectually distinguished). The user-community is the involved life force of WEY and consists of a specific collection of groups:

children at Washington School; parents; teachers; administrators; and local residents of all ages.

The participant community stands in a different relation to WEY. Since they are a more highly differentiated, uninvolved collection of organizations, groups and individuals, they can be more appropriately considered as a "target" of the diversified WEY dissemination effort. In spite of the participant community's outward diversity (in terms of age, role, position, race, etc.), it is clear to us that a considerable degree of values convergence must exist among them, in order for initial contact with dissemination media to occur, and for further interest to be generated. Elsewhere we have termed this prerequisite, the 'fifth world values orientation' of the post-industrial person/community (i.e., one who is attempting to lead a self-sustaining, non-consumptive, decentralized, ecologically appropriate life style with the wise partnership of intermediate non-exploitative technology). To be positively disposed toward WEY, a person must have some degree of fifth-world direction. Failing this, participation must be initiated with some degree of short-term involvement, in order to switch a non-participant to a path of long-term commitment to the dissemination effort.

In closing this section we might note one problem that plagues us as much as many other workers/projects in the field of social environmental innovation; namely, that one is least understood or appreciated in one's own immediate bailiwick—including in our case the central administrative staff of BUSD and certain closely-associated academic/professional colleagues. We feel this is an important issue for investigation, although at present we have little constructive contribution to make.

HISTORY

A detailed history of WEY is beyond the scope of this paper; it will appear in other publications in the near future. In summary, six distinct phases have been identified, with a seventh projected, as follows:

1. An extended period of ideation and project formulation involving a small leadership group (1971);

2. A specific planning phase of identifying user/potential user groups, seeking input data from them, plus site analysis and the development of a tentative plan on paper (1971-72);

3. An intense peak of initiation activity when the first physical changes were made to the site and users became physically involved (Spring 1972);

4. A drawn-out period encompassing the gradual development of physical elements and the continual search for funds while defending the project from premature closure by authorities (1972-74);

5. An emerging consolidation phase; as the substantive site evolved it began to take on a recognizable form and provide an adequate comfort level, and began to be used for formal curriculum activity;

6. The growth of maturity as the community of children, parents, teachers and neighbors began to share a common two-way understanding of their communally reconstructed, highly visible, open space (1976 onward);

7. A future state of institutional stability, when information will flow primarily from the project into the wider world of application in many different contexts.

PROCESS/PRODUCT

The contemporary technological, materialistic mode of thought has sanctioned the separation of process and product in human endeavors. Conversely, in WEY it has been found necessary to abandon this way of thinking. Our experience has been that to speak of one is inevitably to include the other. In other realms such a fusion of process and product is usually defined as "art." Thus, we find that the only workable metaphor for WEY is one of social art; i.e., drama. The world is taken to be a theater, within which a drama is born of the juxtaposition of the disparate elements of the human condition. It is the battle of values that ensues every time change occurs. The stage-setting is WEY, but unlike the artifice of conventional theater the scenery consists of real objects in real space, rather than a temporary, painted canvas fabrication.

There is not the space here to do sufficient justice to the on-going everyday drama of WEY. It is a complex, detailed, sometimes exhilarating, frequently frustrating, often comical, occasionally deeply tragic arena. The stage, of course, is the yard itself. Off-stage there is a "cast of thousands" whose members appear from time to time, sometimes unannounced, and occasionally with sinister intentions.

The major difference between this drama and conventional forms is that the script is to a large degree "open." The plot is set in the present, but it has evolved from its own history and is beckoned by the future. The essence of the drama is the inherent tension existing in the present moment as the nexus of past and future, between diagnosis and prognosis, deduction and induction. As in Greek drama, there is a main cast of heroes and villains deeply involved as instigators of the primary line of action. There is also a chorus who "participate" but who are "uninvolved;" they comment on the action, sometimes filling the stage with their emotional response to visible events, albeit joy or sorrow. The openness of the drama, its responsiveness to indeterminate social events, gives it a high degree of spontaneity. It "becomes" enacted as it goes along. Only much later can it be set to paper, ex post facto. The spontaneous process gives rise to innumerable sub-plots—sub-cycles of action spinning off-stage to develop or die in other times and places; or they descend on-stage, from some other place where they were initiated. Past, present and future overlap and intertwine in complex cycles of contrapuntal action and networks of memory. The NOW in front of our eyes always looms large as it travels from what was to what may be. At the scale of daily perception, physical change appears to progress in small incremental steps. But the larger scale perspective of history expresses the more comprehensive ordered reality over the course of time, from seemingly almost random acts. The truth demonstrated is that macro-order grows from micro-actions. The result shows the futility of attempts to impose order on a community's structure of behavior from outside, in plans, administrative orders, from erratic directives, architectural designs, etc.

The act of ideation in 1971 brought together a small leadership group (Mary Jefferds, Robin Moore and Herbert Wong) who already held certain fundamental convictions about childhood, environment and education. The disparate backgrounds of this trio funneled into an interdisciplinary ethos and the avoidance of premature dogma. In this phase the leadership group also drew upon the expertise of long-standing professional colleagues and the experience of personally acquainted local politicians. Thus, for awhile, there was a de facto consultant group in existence, some of whom are still involved on an ad hoc basis. The process of ideation had of course been evolving in each individual during the whole of their lives, before actually meeting each other. The meeting itself, the prologue of the whole drama, was "produced" by the grant from Educational Facilities Laboratories. Theater cannot exist without money.

Since a key component of the ideational philosophy was community participation and involvement, the act itself was short-lived. To avoid any feeling of community separateness or elitism, the Act of Planning rapidly emerged from Ideation. Planning has been defined by John Friedmann as "the application of intelligence to the future;" operationally, it is concerned with the assessment of the values held by different social groups in a given community—expressable only when faced with the prospect of change. The values of constituent groups (children, parents, teachers, non-academic staff, neighborhood residents, after-school users of the yard) were codified and assessed via a set of formal instruments: cognitive mapping, questionnaires and systematic behavioral observation; and group process syndetic techniques such as brainstorming, community clinics and environmental encounters—each a dramatic scene in its own right.

Once values had been assessed, they had to be applied to the site in terms of tentative specifications for change. To conduct this process, a core group of the ideational leaders, plus teachers and community people, was formed. A series of difficult, often confused weekly workshop meetings was held during the 1971-72 planning period. Difficulties arose because of the "searching-in-the-dark" nature of the situation. Although many constituent values were clearly expressed (e.g., parents wanted to see radical physical changes made; children stressed natural materials and objects—particularly trees and water), the core group found it very difficult to project such values into a detailed operational image of what the whole thing might look like on the ground and how it would be used. Projections tended to be over-simplified, stereotypical derivations of existing models; e.g., the application of various existing structured curricula to an imagined "creative playground."

By February, 1972, the balance of influence in the participant community had shifted from those who wanted to continue talking in the core group, and those who wanted to act. Hence, the third act of initiation came into being at a precise moment in time, with the first Yard Fest, a community involvement event at which the first square feet of asphalt were symbolically torn up—literally with people's bare hands.

In a sense, initiation marked the division between prologue and main action—a hurdle that many environmental-action projects never cross. The initiation of physical change enables participants to become involved; in effect it demarcates two states of awareness. These are the "functionary state" where the community exists as a mere extension of underlying status quo authority, where values consist primarily of "behavioral compliance" with existing rules and regulations (Scriven, 1966); and the "syndetic state" where people are forced to make new connections with the environment, by being confronted with a changed reality. In the syndetic state, values formation inevitably moves to a "procedural" plane that "embraces evidence, reason and judgment—the interposition between impulse and action" (Wong, 1976). At this point in its history, WEY still exists in the syndetic-procedural state of "finding itself" in the current act of growth, development and consolidation. In the future lies a third state, when the presently existing high degree of self-communal-environmental awareness has evolved into "substantive" fifth world values. This potential state—which even now can be occasionally glimpsed in isolated WEY events (such as the Yard Fests)—we have termed anarchistic, meaning self-governing or self-sustaining. The anarchistic-substantive state cannot be taught, or even sought, although it can be imagined as a future point of arrival. The "right" conditions for making the journey can be created, and are in effect the relationships and understandings established in the pedagogical process of the purposive-syndetic period. Possible acts that would arise in the anarchistic state would be maturity, decline and eventual abandonment and transposition to new socio-environmental conditions existing in the future world, whatever they might be.

This summary historical interpretation and perspective cannot be concluded without a brief return to the leadership group referred to at the beginning. Leadership (as distinct from authority) in the hands of the same two individuals has provided the essential spiralling strand of continuity throughout the WEY-process until this time. More than any other factor, the modest success of WEY must be attributed to the cognizance of the key roles of leadership and the importance of their continuity and quality. The key roles have been "political" and "logistic;" i.e., relating respectively to people and to the ordering of physical resources in space and time. Qualitatively, a large degree of values convergence must pre-exist and be maintained amongst the leadership for effective "play" to proceed. Furthermore, in the game of power politics, such convergence must be sought out within the authority that calls the tune. Project WEY fortunately identified an advocate within the school district power circle who was able to defuse the "change-phobia" of the district central administration and periodically to channel support. Thus, WEY was able to survive the aftermath of the Initiation Act.

Additional convergences have arisen with significant community people, in positions of power or influence, as with particular members of the teaching staff. Together this "leading group" of significant people, within the broader participant community, exerts influences, via their attitudes and life-style, in a painfully slow process of value-formation—along the lines of Hall's (1973) model. Thus, values-formation is a mutual process, informed by dialogue between leadership and community. In the syndetic state, leadership has to take responsibility for initiating change; but equally, the community has to inform the basis for such initiative via the quality and quantity of their response to change. In the anarchistic state, of course, distinctions between leaders and led would merge as mutuality becomes universal and as the values of significant people—parents, siblings and teachers are reinforced or supplanted by the emergent environmental-change ethos.

EVALUATION

Different interpretations can be placed on the term "evaluation." We take it to indicate the extent to which WEY has fulfilled its purposes. In this respect most judgments are relative, although many contain binary (yes/no) aspects, they will remain evolutionary (and therefore tentative), rather than absolute. If the view is taken that the evaluation of social phenomena is in itself a value-based procedure, then the concept of "external evaluation" is subject to some inherent methodological difficulty. At best, such an effort takes a partial view of the reality that might be perceived by an insider; at worst it is hopelessly biased by the preconceived categories of analysis held by the evaluator(s).

There exists one published systematic evaluation of WEY (Hester, 1976) which, though it was a valid and well-intended attempt to make a comparative study of WEY in relation to seven other community-based recreation projects, can be justifiably criticized as partial, biased and superficial (the evaluators spent only a single day on-site, three years ago). Having said this, one can also say that a hard-cover publication containing a serious systematic look at WEY, together with the numerous anecdotal articles and book inclusions (in several countries) that discuss the project, add up to some degree of vindication of its apodictic function: WEY is an existing reality that confronts the world as an evolving process model. Several of its purposes as a demonstrative system of concepts are thus served in the fields of education, recreation and environmental design. As time goes on, as more of the concepts are worked out on the ground, more substantially—as WEY as process becomes symbolized in visible product—its transfer power could increase to the point where it becomes a mass-media candidate. At such a point the dangers of journalistic exploitation and dilution would have to be guarded against.

All of WEY's purposes have passed the binary (have they been initiated, yes/no) hurdle of judgment. For example, children's informal play is being incorporated into the formal curriculum; integrated curricular framework materials are being published; a low-maintenance drought-tolerant landscape has been established; WEY has been used as a site for in-service training—and so on.

Once the binary threshold has been passed, then evaluation becomes a more detailed, continuous procedure of documenting the quantity and quality of each purpose; e.g., how many training sessions, for how many people, for how long and of what scope? Or, which types of play have been incorporated into the curriculum, to what degree and with what developmental outcome?

The only way in which such questions can be sensibly answered is by reference to WEY's own inherent premises. At the most general level of interpretation these may be labeled "prime ecological values or dimensions;" namely: diversity, change, interrelationships and adaptation or evolution. In essence, what we have to evaluate is an on-going process of change—one which is oriented toward the propogation of diversity in all senses, at all levels, but which also has a distinctly special orientation toward pedagogical growth and the development of moral reasoning. Based on an understanding of the nature and substance of people-environment interrelationships, this will lead eventually to the permanent establishment of substantive environmental values. Ultimately, the concern is with creating an adaptive mechanism to foster a new direction for human evolution.

The question is, how can the relative attainment of this ecological purpose be measured? In the main, the answer lies in the use of techniques derived from the methods of classical ecology socially adapted to the on-the-ground people-environment situation. At WEY this work has been pursued in a series of studies since the project's inception. Field investigations have been conducted, using a variety of interview, questionnaire and graphic/mapping instruments at regular intervals. We now have a series of bench-mark measures of use and of participant response which enable relative judgments to be drawn. The most relevant, and by far the most extensive cycle of validation was conducted last year (1975-76), under the auspices of a HEW grant. Results from this work are still being interpreted and are thus not available for publication; nonetheless, the dramatic effect of WEY's diversified environment is clearly expressed in perceptual changes amongst children, parents and teachers, and in clearly observed behavioral changes in the children. In the pedagogical realm our most recent data have enabled us to make clearer and more detailed differentiations with respect to the variety of personal, institutional and environmental factors that account for substantial differences between teachers' overt responses to environmental change and curricula challenge.

Many convictions, previously held on an intuitive level, are receiving empirical support. For example, it is empirically clear that water and aquatic systems in general are the uncontestable primary topic for Environmental Education now and in the future. Water is the most pressing of all world-wide environmental issues; aquatic environments are more attractive to young children than any other single element; water resources are the most contentious component for implementation on school sites as far as administrators and insurance engineers are concerned. Finally, aquatic systems have the highest interdisciplinary potential—in fact water may be called the supreme transdiciplinary subject.

ASSOCIATED RESEARCH

Following is a list of published and unpublished dissemination material, none of which contains empirical data. Empirically-based material is currently in process. Several research reports for eventual publication are projected this year, resulting from studies conducted during 1975-76.

"Anarchy Zone: Encounters on a School Yard." *Landscape Architecture* (October, 1974).

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"Environmental Value Change Via Creation of Environmental School Yard Ecosystems." *Current Issues in Environmental Education - II: Selected Papers from the Fifth Annual Conference of the National Association for Environmental Education* (Atlanta, April 1976). ERIC/SMEAC, 1976.

Hester, Randolph T. *Neighborhood Open Space*. Stroudsburg, Pennsylvania: Dowden, Hutchinson and Russ, Inc., 1976.

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MINNESOTA ENVIRONMENTAL SCIENCES FOUNDATION, INC.

by Michael J. Naylon*

After their initial federal grants ran out, many environmental education programs disappeared without a trace under the waves of local school budget strictures. Not so at Golden Valley, Minnesota. What in 1967 was a single school district demonstration laboratory in the biological sciences has become the Minnesota Environmental Sciences Foundation, Inc., engaged in the creation, dissemination, and implementation of "environmental knowledge delivery systems" through such state and national instrumentalities as the Minnesota Department of Education, the U.S. Fish and Wildlife Service, the Hudson Foundation, the U.S. Office of Education, the National Park Service, the Upper Great Lakes Commission, and the Minnesota Energy Agency. All told, Golden Valley has parlayed a start-up grant of $180,000 into a $2.5 million enterprise in nine years. Many a school district of size in this country has Golden Valley literature among its instructional materials.

The Minnesota Environmental Sciences Foundation, Inc. (MESFI) is engaged in the creation, dissemination and implementation of *Environmental Knowledge Delivery Systems*. Its primary activities center around education, planning, and the production of materials to help people make responsible environmental choices. Its primary evaluation criterion for program success is the ability and will of its clients to carry on after the Foundation has completed its involvement. To define:

A. Environmental Knowledge Delivery Systems

That collection of activities, processes and strategies that help people acquire knowledge, skills and attitudes which contribute to their understanding of ecology and the effect man has on Earth's ecology, so that society can make informed environmental choices.

B. Creation

Those activities which lead to the development of new or improved environmental materials and programs which can become part of the systems described above.

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C. Dissemination

Those distribution activities that put MESFI systems and those of others in the hands of people who need them in their environmental activities with others.

D. Implementation

Consultative activities which help people use materials and programs in their efforts to help others in environmental education programs and related activities.

MESFI had its beginnings under a Title III grant awarded to the Golden Valley School District in 1967. The purpose of this three-year, $667,894 grant was to establish "an Instructional Research and Demonstration Laboratory in the Biological Sciences for Elementary and Secondary Pupils."

Within the first six months of operation, a needs assessment conducted by the original staff of five resulted in a switch of emphasis from biological sciences to ecological relationships. The project became known simply as "The Environmental Science Center." It was at that time and still is located in the Golden Valley School District.

Primary emphasis for Center programs addressed itself to the need for elementary teachers in the area of environmental background. It was found that elementary teachers could not get basic ecology courses nor were there ecology-oriented materials available for them to use. The Center focused on the development of in-service programs designed to give these teachers an informal but workable background in simplified ecology concepts. Workshop materials written specifically for these courses were subsequently published by the National Wildlife Federation as its Environmental Discovery Unit series. These materials are currently in their second printing by the Federation.

In the early years all services were provided free of cost. Primary target area for the project was the seven-county metropolitan area surrounding Minneapolis and St. Paul. The Center, however, soon found itself responding to out-of-state requests for aid as well as inquiries received from various places around the nation. Assistance provided in one of these instances ultimately lead to the formation of the Foundation and subsequent continuance of the project.

In 1968, Foundation staff assisted an individual in establishing a 3000-acre natural history preserve. The preserve ultimately had a resident manager, conducted a variety of habitat improvement projects, constructed some 23 miles of trails and initiated funding on a 20-year grouse research project with the University of Minnesota. This individual found that the Center was programmed to phase out at the termination of its federal grant. He then suggested that the legal structure of his foundation be turned over to the Center. In 1968 the transfer was made. Family members of the foundation resigned and a new board was constituted. The Environmental Science Center, still currently funded under the federal project, was programmed to phase into the Foundation as its educational unit. In 1969 original fund raising began for the Foundation. The pattern of federal and state funding, as well as contracting and soliciting gifts and donations, has continued for the past nine years.

The original logo for the Environmental Science Center was the cattail. It was chosen to emphasize its orientation to the environment. That logo has since evolved to a cattail set on a background of water and an urban skyline. This graphic evolution has paralleled MESFI's reorientation away from strict biological relationships to increased concern for social solutions to environmental problems.

PROGRAM AND FUNDING HISTORY

Minnesota Pilot Environmental Curriculum Project

The Minnesota Environmental Sciences Foundation, under contract to the Minnesota Department of Education, developed a sample environmental curriculum package of thirteen units, K-12. Guides and background information for teachers, techniques and investigations for students, and supplementary materials were included in each unit. The complexity of investigations runs from observing relationships in the lower grades to community planning in high school.

A strong interdisciplinary approach is inherent in environmental studies, and students were involved in considerations of economics, aesthetics, scientific measurement, statistics, social values and cultural behavior. The sample curriculum was tested for applicability to Minnesota's environmental education needs in twelve pilot school districts and revised following evaluation by teachers and students. This project was supported by a $16,000 contract with the Minnesota Department of Education.

In-Service Education

In-service programs provide teachers and youth group leaders with the opportunity to gain new insights into both the subject and methodology of environmental conservation education and related fields. These programs stress involving teachers with materials and ideas which in turn are used in their classrooms. Courses are offered for teachers of all grade levels. Many school districts recognize these courses for local salary credit. These services are sometimes provided at no cost to the participants. Select programs provide college graduate credit. More than 17,000 people have participated in these programs during the past nine years.

Vocational Agriculture Program

Under contract with the Division of Vocational and Technical Education, Minnesota Department of Education, MESFI developed a manual entitled, Managing Natural Resources: Air, Water, Soil and Habitat for Wildlife. Twelve separate instructional units exposed vocational students (grades 7-12) to the environmental requirements of wildlife. Extensive field work was the major thrust of the programs. Activities ranged from relatively easy, short-term studies to investigations that must be carried on more or less continuously throughout the year.

Lesson content focused upon the following:

1. Introductory activities designed to promote a general awareness of wildlife relationships, to acquaint student managers with field observation skills and to provide experience in the interpretation of field information.
2. Basic skill development activities designed to provide practice in using field survey techniques, to introduce the concept of habitat change caused by varying management techniques, and to demonstrate methods of maintaining favorable wildlife habitat.
3. Management ecology activities designed to provide an opportunity to apply skills and concepts acquired in earlier activities, to promote awareness of the structure and function of wildlife populations, and to become actively involved in the examination of actual predator-prey interrelationships.
4. Actual management projects to be implemented on a long-term basis that provide for a practical application of the student manager's training, and set the stage for realistic habitat restoration projects on private land.

No specific wildlife management "right answers" were included in the activities. Instead the materials emphasized the importance of using life histories and the good judgment of professionals in making habitat management decisions.

Long Lake Conservation Center

This program was supported by a contract with the Department of Education for the amount of $5825. MESFI staff directed the educational program at the Aitkin County Long Lake Conservation Center. The 1970 summer program consisted of four two-week sessions for junior high school-aged students and the two two-week sessions for teachers. Teachers' sessions were conducted in cooperation with the state college system, thus enabling participating teachers to receive graduate credit for their work. One hundred forty students and fifty teachers participated in the program.

Department of Interior - The 21st Classroom

The Bureau of Sport Fisheries and Wildlife, Department of Interior, entered into a contract with MESFI to develop and implement an environmental education program for wildlife managers and to develop curricular materials appropriate for manager use with school groups visiting wildlife management areas. This project provided a method for National Wildlife Refuges to establish incentive and facilities for teachers and students to pursue environmental studies, thus enabling the public to better understand the basic conservation philosophy of the Refuges. A pilot study of feasibility was conducted in the upper midwest region based on experiments with school groups, teachers, and refuge managers at several midwest refuges.

Three major publications for use on federal lands were completed. They are:

1. Refuge Manager's Handbook
2. Teacher's Handbook
3. Outdoor Classroom (a series of instructional activities to be conducted in conjunction with the above handbooks). This series is now entitled We Can Help, and is published by Jenny Publishing in Minneapolis.

Man and His Community: A Program for Quality Environment

The format of these experimental materials is considerably different from others currently available. It is a three-part package, composed of:

1. A community problem inventory.
2. A set of investigations and activities.
3. Action suggestions.

The components of the package fit together via a keysort system and the entire content of the series is printed on pre-punched keysort cards.

Individuals (students as well as adults) were able to identify specific community problems in the inventory, locate investigations related to the problem and, finally, be keyed to an action program appropriate for resolving the initial problem. A manual was included to guide teachers, group leaders or individuals in the proper use of the package. Instructions were included for the manipulation of the cards. These materials were trial tested by high school and college students and necessary modifications made as a result of the evaluation obtained.

The first package included water-related problems: aspects of water quality, water-related land usage, watershed, water supply and sewage disposal in a keysort system. Additions to the system will be available at later dates. These will include land usage, consumer problems, air pollution, and population. This program was partially funded by a $10,000 grant from the Laura and Walter Hudson Foundation.

Environmental Studies

Continuing the broad range of services within this unit of operation, the Foundation has completed more than 300 school site and natural area development and utilization studies accompanied with associated workshops. It provides technical consultantship services and conducts classes and a variety of workshops.

The Foundation conducted a natural area school utilization survey for a major Twin City corporation to be incorporated in its development and expansion plans. This corporation is interested in preserving, within its property holdings, natural areas for use by schools and the public in pursuing environmental studies. Further, it cooperated with, conducted workshops for, and developed six units of curriculum materials for the Minnesota Department of Natural Resources and the U.S. Forest Service. For one year, it provided an activity article for each issue of the Department of Natural Resources' Conservation Volunteer.

Staff members have served other organizations such as the Minnesota Association for Conservation Education, Minnesota Education Association, Minnesota Federation of Teachers, Minnesota Academy of Science, the National Conservation Education Association and other Boards of Directors as committee chairpeople, workshop teachers and as resource people.

Some of the above activities were supported by associated service fees. However, most were provided at no cost. The U.S. Office of Education awarded the Foundation a $50,000 grant to permit it to continue and expand upon these services during 1972.

Community Environmental Studies Program

As prime contractors to the Golden Valley Public Schools, recipient of a three-year $480,000 grant from the U.S. Office of Education, MESFI developed a model that incorporated the "total" community into a learning process. The program developed means by which the learner could move into his community and identify the interrelationships—sociological, ecological, political, legal, aesthetic, etc.—that determine his way and quality of life.

The program, during its three-year duration, worked with three communities—urban-suburban, agriculturally oriented rural, and forest-product recreation rural. Community councils were established consisting of students, governmental officials and the lay public. They assisted in an advisory capacity in bringing the community to the school and the school to the community.

Curriculum materials were used as a rallying point and caused the learner to move into the community to gather real data on cultural and natural systems. They related to the ultimate impact of man on natural systems and their reciprocal impact upon humanity. A fundamental working knowledge of the problem-solving aspects of the political process was gained from the learner's work in the real community. The ultimate goal was to effect a knowledgeable decision-making populace with an affinity for personal action.

Included in the study was an in-service model to guide schools in training teachers to work more effectively with children in inquiry-oriented activities that focused on their community. It was designed to aid teachers confidently to adopt a style of teaching in which their major role is one of guiding inquiry and decision-making. The model served as a resource guide for district personnel to use on a continuing basis in their in-service programs.

Emphasis was directed toward the human and physical community, method of inquiry, sets of real data and the decision-making process related toward achieving and maintaining a quality environment. An outside evaluation was conducted by Educational Management Services, Minneapolis, Minnesota.

Environmental Vocational Education Program

With a $491,000 three-year grant from the U.S. Office of Education, MESFI, in cooperation with the Robbinsdale Public Schools, developed and implemented a program in environmental-vocational education (grades K-12) based on the emerging relationship between occupations and environmental quality.

The program utilized the newer and more relevant curriculum materials as well as programs developed by both the Foundation and Robbinsdale Public Schools. These were merged to provide a model that could be implemented by other schools. Inherent in the program was a sophisticated counseling and career placement service program. The business and industrial community was involved in providing projections for emerging careers and training requirements. Further, through the established Community Career Center, they assisted in job placement and on-the-job training for students. This Center is still in operation. Outside evaluators: Educational Management Services, Minneapolis, Minnesota.

National Park Service

MESFI staff contracted with the National Park Service in a year-long study developing a set of analogs describing parallels between natural and human ecosystems. This 376-page manuscript is currently being reviewed by scholars throughout the U.S. and Park Service personnel.

Citizen Mobilization Program

This program was funded by the U.S. Office of Environmental Education; its purpose was to establish process guidelines for mobilizing citizen groups in response to locally identified environmental needs. Three major programs were run relating to lakeshore zoning, management and legislation; land-use planning and zoning regulations; and a four-county wildlife habitat improvement program involving farmers, sportsmen and school groups. Of the three component programs, the habitat improvement project (subsequently identified as "Project Coexistence") is still operative and now involves some 300 acres of privately owned land. Primary responsibility for the continued implementation of this program has been assumed by the Regional Environmental Education Councils in Minnesota.

EE Option One

This program was a $150,000 two-year effort primarily made possible through a $75,000 matching grant to the Foundation by the Bush Foundation. The primary purpose of this program was to develop materials for the secondary schools and to facilitate continued multi-disciplinary implementation of environmental education into the school programs. Twenty-six trial units were produced, field tested and subsequently condensed into four multi-disciplinary packets. A site planning manual and several filmstrips were also developed. In our estimation the most innovative aspect of this particular project was the Joint Management Team which consisted of representatives from the Department of Education and MESFI staff. This team cooperatively developed program schedules, made decisions on budgeting and provided overall supervision and direction for the program. It is an excellent example of how state agencies and private organizations can work together in promoting coordinated state-wide efforts in environmental education. Primary contact for this program is John Miller, Environmental Education Consultant, Minnesota Department of Education.

Deep-Portage Conservation Reserve

MESFI staff assisted the Cass County Commissioners in acquiring a $43,000 grant from the Upper Great Lakes Commission to develop site planning recommendations and educational programming for a 6000-acre tract of land. Plans were developed for community involvement, educational programming, and facilities on the site, as well as a series of trails for a variety of outdoor recreation purposes. A private foundation has since been formed which is assuming the responsibility for continued financial and programmatic support for the project. This foundation works with a steering committee composed of representatives from the foundation and the local community, including the Cass County Commissioners. Programs are now on-going and a major effort is underway to begin actual construction of the physical facility.

CURRENT PROGRAM EMPHASES

Environmental Planning

MESFI is currently involved in assisting one local developer, one major midwestern business and a village park and recreation commission in the areas of assessment, planning and facilitating community involvement. Consistent with its major educational orientation, all of these projects have a strong training component in which MESFI provides for educational opportunities for users or skill acquisition on the part of community and business members so that they may replicate the process in the future without Foundation assistance.

Hunting Ecology Program

MESFI is working with the Department of Natural Resources in the development, testing and subsequent implementation of a state-wide hunting ecology program that goes beyond the current efforts in gun safety instruction. Primary orientation for this program is an emphasis on the ecology of game species, ethics, related skills such as survival and orienteering, and habitat improvement. About 600 people will be involved in this year's pilot program. The Foundation is conducting a major fund-raising effort in an attempt to provide additional funds so as to accelerate the program development with the Department of Natural Resources.

Minnesota Energy Agency

MESFI staff currently are working with the Energy Agency and the Department of Education in the development and field testing of junior high energy education materials. Development of this packet has been completed and some 26 activities have been distributed to teachers throughout the state for field testing. Revisions will be made in the spring of 1977 and materials will be ready for distribution during the summer of 1977.

FUNDING

Below is a general summary of MESFI funding sources for the past nine years. As indicated, MESFI spending and staff size are characterized by a waxing and waning related to income supporting programs.

	Special Purpose Grants	Contributions	Contracts	Curriculum	Total
FY 68	180,000	-0-	-0-	-0-	180,000
FY 69	200,000	17,570	-0-	-0-	217,570
FY 70	175,000	24,866	-0-	-0-	199,866
FY 71	56,537	109,867	40,213	6,000	212,617
FY 72	305,404	86,086	17,361	6,935	415,786
FY 73	325,253	170,332	30,902	7,000	533,487
FY 74	240,632	70,765	48,515	7,671	367,583
FY 75	31,062	105,960	87,904	9,046	233,972
FY 76	4,063	17,362	69,054	6,065	96,544
Total	1,517,951	602,808	293,949	42,717	2,457,425

ENVIRONMENTAL EDUCATION IN MASSACHUSETTS

by Charles E. Roth*

The environmental education movement got more people talking to each other about public education at all levels than any other recent concern. In many states the catalyst was the felt need for a state EE plan. There were a number of reasons for this confabulation: (1) the gut recognition that EE cut across a wide variety of issues and interest groups, (2) the historic role of voluntary associations and public agencies in conservation education, and (3) the clear signal that Washington blessings would flow only to states with broadly-based EE programs. One of the first states out of the starting-blocks was Massachusetts, and its formal 1972 EE plan became the prototype for follow-on approaches by many other states. In its involvement of a cross-section of society, its comprehensive assessments, and its clear commitments, the Massachusetts plan fortunately represented a sound model. As with many other state EE plans today, the Massachusetts document has suffered from the slings of apathy and the arrows of fiscal misfortune, but it remains ready to be dusted off and put to work in the presence of a renewed impetus which will take only time, given the promising framework of Massachusetts' Trust-EE structure.

On May 5, 1961, the Governor of Massachusetts signed an Act which established the position of Conservation Education Supervisor within the Commonwealth's Department of Education. Shortly thereafter, the Board of Education appointed the Massachusetts Advisory Committee on Conservation Education (MACCE) to advise the Supervisor of Conservation Education and the Commissioner of Education. The MACCE Committee was responsible for a number of conferences and reports, including recommendations to the Special Commission relative to improving and extending educational facilities in the Commonwealth. The MACCE Committee has also offered assistance from time to time to the Department of Natural Resources in connection with review of sites for the development of a state environmental center.

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In May of 1970, the MACCE Committee established a sub-committee to begin work on the Commonwealth's Commitment to Environmental Education. The sub-committee spent the summer and ensuing year putting together the first efforts toward a State Plan. In October of 1970, the Environmental Education Act (P.L. 91-516) was signed into law by President Nixon. The Act required that all states have a State Plan by the end of 1972.

In April of 1971, the MACCE Committee voted to submit a proposal under the Environmental Education Act for money to set up a Task Force more broadly based than the Committee, and with some paid personnel to carry on the work already accomplished by the MACCE sub-committee. The proposal was one of six state planning grants funded and the Task Force met in September of 1971 to start work in earnest on an environmental education plan for the Commonwealth.

The Task Force was charged with three priorities during its first year of operation:

Its first job was to *assess all aspects of environmental education programs currently in progress* at all educational levels within the Commonwealth. Of particular interest were those programs which involve the participant directly in explorations of natural and man-made environments and those which provide action to resolve environmental programs.

A second priority was to *determine the environmental education needs* within the Commonwealth and *to establish priorities* within those needs. Since priorities change with changing times and a plan can be obsolete when written, a proposal for *an on-going state planning system* was a third priority and a Trust for Environmental Education—TRUST-EE—was developed for consideration.

Both the Massachusetts Advisory Committee on Conservation Education and its Environmental Education Task Force put in a considerable amount of time and effort in achieving the three objectives. The Task Force pulled together a great deal of material into a coherent report explaining not only the current state of environmental education within the Commonwealth, but also defining the needs as seen by educators, federal and state agencies, and public and private organizations from all over the state. These needs were set up in terms of priorities for implementation by the Commonwealth. The planning system, in the form of a trust instrument and operating procedures for the Trustees, was also spelled out in detail.

For planning purposes, the task force study was envisaged as a two-year program, with the first year's activities based upon the three objectives stated above, and the second year based upon further investigation and clarification of the needs and priorities and the actual setting up and funding of TRUST-EE.

FORMATION OF TASK FORCE COMMITTEES

At the first meeting of the Task Force in September of 1971, the members selected a plan for categorizing elements of environmental education and the work of the Task Force. Working committees were then set up according to those categories and members expressed their committee preferences. In actually setting up the committees, Task Force members were assigned according to their first choice wherever possible.

The following committees were agreed upon:

1. *Elementary and Secondary Education*—including all public, private, and parochial schools from kindergarten through high school. (In this report the word education in the committees name has been changed to schooling.)

2. *Higher Education*—including all public and private colleges and universities. (In this report the committee name has been changed to Higher Schooling.)

3. *Continuing Education*—including museums, zoos, aquariums, sportsmen's clubs, conservation commissions, youth groups, land trust organizations, the news media, business and industry. (In this report the committee name was changed to Public Non-school Education.)

4. *Federal and State Agencies*—including all that have a major impact on environmental affairs.

5. *Organizational Planning Committee*—established to work on the development of the state planning system—i.e., the Trust for Environmental Education and its structure. This committee also functioned as a steering committee.

SURVEY SAMPLE SELECTION

For the survey of environmental education in the Commonwealth and a statement of the needs, the following populations were used:

1. All public, private and parochial kindergartens, elementary and secondary schools in the Commonwealth as recorded by the Research and Development Office of the Department of Education in the listings of January, 1972.

2. All public institutions of higher education and all private colleges and institutions as listed by the Office of the Board of Higher Education for the Commonwealth and the Massachusetts Section of the United States Directory of Institutions of Higher Education listings as of January, 1972.

3. a. All Massachusetts aquaria and zoos and a sample of museums based on size compiled by Task Force volunteers from a number of source listings as of March, 1972.

   b. All sportsmen's clubs as listed with the Massachusetts Department of Fish and Game as of March, 1972.

   c. Newspapers, TV Stations and Radio Stations as listed with the Massachusetts Audubon Society and WGBH-TV.

   d. All conservation commissions as listed with the Massachusetts Association of Conservation Commissions as of March, 1972.

   e. A sample of land trust and watershed organizations compiled by the Massachusetts Audubon Society and updated through March of 1972.

4. All federal and state agencies within the Commonwealth as compiled by the Governor's Youth Task Force on the Environment as of December, 1971.

METHODS OF DATA COLLECTION

The Task Force debated the question of whether or not to computerize the questionnaire to simplify data retrieval. Upon advice of a knowledgeable Task Force member, it was decided not to attempt computerization because of the relatively small sizes of the various populations to be surveyed.

Each committee met monthly to plan with the Executive Secretary, Warren M. Little, Director of Education, The New England Aquarium. Each committee was responsible for developing its own survey instrument, establishing its suspense dates, and determining the methods of follow up and analysis of results.

The bulk of the work in producing the questionnaires, collating them, stuffing and stamping, as well as the follow up activities was done by the Task Force staff and a set of loyal volunteers who noted the publicity of the Task Force and expressed a desire to help. In addition to office volunteers, the follow-up work was handled through the development of a network of volunteers from all over the State developed through word of mouth, personal contacts through Task Force members, newspaper publicity and requests for help published in the Newsletters distributed monthly by the Massachusetts Audubon Society and the Massachusetts Association of Conservation Commissions.

Office volunteers compiled lists of schools and colleges with close proximity of other volunteers throughout the state; these lists were sent out to volunteers with instructions as to how to visit or telephone college personnel and principals who had received the higher education and elementary and secondary school questionnaires. The federal and state agency follow-up was handled by the Governor's Youth Task Force volunteers who also conducted their work primarily by telephone. Because of the lateness in getting out the continuing education questionnaires, no effort was made to conduct a follow-up, which accounts for the relatively low number of returns.

A second questionnaire was mailed out only to those who requested them. No complete second mailing was made because of a time factor and the lack of enough volunteers to take care of the mechanics of getting such a mailing out.

Although response dates were established on all questionnaires in order to receive the returns as soon as possible, the cutoff dates were not adhered to in tabulating the data. All information was used up until the latest date possible to establish a larger percentage of accuracy.

NATURE OF SAMPLE

Table 1 shows the nature of the sample used in surveying the current status of environmental education in the Commonwealth. The total returned is greater than the total tabulated because some questionnaires were returned after the cutoff date established by each committee.

TABLE 1

NATURE OF SAMPLE

School/Organization	Total Mailed	Total Returned	% Returned	Total[a] Tabulated	% Tabulated
Elementary and Secondary Schools	3127[b]	1069	33.7%	1057	33.3%
Higher Education	120	75	62.5%	75	62.5%
Federal Agencies	56	31[c]	55.4%	31	55.4%
State Agencies	200	104[d]	49.0%	104	49.0%
Newspapers	301	18	6.0%	18	6.0%[d]
AM/FM Radio Stations	68	19	28.0%	15	22.1%
TV Stations	12	5	41.7%	5	41.7%
Museums, Zoos, etc.	306	48	15.7%	38	12.1%[e]
Sportsmen's Clubs	367	12	3.0%	11	3.0%
Conservation Commissions	300	72	24.0%	52	17.3%
Land Trusts	50	8	16.0%	8	16.0%

[a] As of cut-off dates established by each committee.

[b] Includes all public, private and parochial schools.

[c] An adjusted number; 22 questionnaires were returned representing 31 agencies. (See Report of Committee on State and Federal agencies.)

[d] An adjusted number; 74 questionnaires were returned representing 104 agencies. (See Report of Committee on State and Federal agencies.)

[e] Low percentages on newspapers, museums, sportsmen's clubs, conservation commissions and land trusts can be attributed to a lack of follow-up before a cut-off date had to be established and a final tabulation made.

No real effort was made to obtain a geographical spread on the returns of any of the questionnaires. At the elementary and secondary level, 250 of the 350 communities in the Commonwealth, or 71.2 percent, did return a questionnaire, giving the Task Force at least some idea of what is going on in school systems throughout the Commonwealth. The returns from higher educational institutions, conservation commissions, land trusts, sportsmen's clubs and the media were also geographically well distributed.

SUMMARY AND CONCLUSIONS

The Task Force divided into five committees, each of which concentrated on one of the four phases of the survey, or on the state planning instrument. Questionnaires were developed and put out with a follow-up procedure handled by a broad-based group of volunteers.

The Task Force was encouraged with the response, and concluded that:

1. There is a great deal being done in environmental education in the Commonwealth, although it is still scattered and primarily due to individual efforts, rather than an overall program.

2. In many cases, it is safe to assume that those schools and institutions which did not answer the questionnaire were those without any formal or non-formal environmental education programs.

3. Further evaluation of the continuing education organizations needs to be carried out in the near future to obtain a more accurate picture of environmental education being carried out in that area.

COMPREHENSIVE SUMMARY OF TASK FORCE RECOMMENDATIONS

The Comprehensive Summary of Task Force Recommendations is reproduced below with minor adjustments:

> "In preparing this section of recommendations for action in environmental education, we have drawn not only upon data gathered from the current study, but on earlier planning work by the Massachusetts Advisory Committee on Conservation Education. Establishment of priority levels drew heavily upon the results of the study, but also relied upon viewpoints gleaned from review of current literature on environmental education. The Task Force has attempted to project ahead over the next decade in its recommendations, indicating both what can and ought to be done promptly as well as indicating directions for sustained effort in the years ahead.
>
> "Our prime recommendation is that A QUASI-PUBLIC ORGANIZATION BE IMMEDIATELY ESTABLISHED TO CATALYZE AND FOCUS THE PRIVATE AND PUBLIC ENVIRONMENTAL EDUCATION EFFORT IN THE COMMONWEALTH. Without such an organization, the other recommendations of this Task Force run a high risk of non-implementation.
>
> "Several alternative structures for such an organization have been explored with the assistance of a law firm. Each alternative was screened according to the following criteria:
>
> a. Is it of sufficient breadth and scope to plan effectively for the environmental education needs of Massachusetts?
>
> b. Is it capable of readily blending funding from public and private sources? (Without such blending, it is unlikely that sufficient financial resources could be assembled to meet the needs. Such blending of funds is difficult at best, and is generally impossible within a strictly governmental framework.)
>
> c. Is it tax exempt and capable of attracting private philanthropy, bequests, foundation and governmental funds?
>
> d. Is it capable of organizational flexibility to meet changing problems and opportunities?
>
> "The result of our explorations is that a public trust organization best meets our criteria. Such a trust is also easily and relatively quickly implemented. A trust would be able to work with governmental agenc , but also be able to make some headway in spite of occasional governmental austerity programs or bureaucratic roadblocks. A trust, with a small catalytic staff, can be quite free to coordinate and stimulate the cooperative staffing and funding of projects from a host of public and private agencies with a minimum of bureaucratic and academic

jealousies. Such cooperation and coordination of a variety of talents are essential to achievement of maximum results on a significant scale from always limited funds and talents.

"This Task Force has gone beyond initial study. It has had all the necessary legal papers prepared to implement the recommendation. The following is all that is currently needed:

1. installment of its Trustees;

2. initial funding of the basic staff;

3. a basic acceptance of this structure as the best answer to environmental education planning and implementation for Massachusetts.

"Once functioning, the organization would:

work closely with education, governmental agencies, community action groups, industry, and other groups and individuals to open new and productive channels of communication and cooperation;

function as an environmental education clearing house and develop and maintain a communication system able to assemble, review and disseminate ideas in the field;

instigate the design and testing of new materials and approaches;

determine annual priorities of environmental education needs and catalyze the talent and funds for developing programs to meet the needs;

assist school systems or groups of schools in preparing proposals for funding locally developed environmental programs which accomplish overall state and federal objectives for the area. This would apply to other groups as well, and would include follow-up to assist in implementing the programs;

explore new technologies for improved instruction.

"It is proposed that the trust be named Trust for Environmental Education or TRUST-EE for short.

"Since any plan, such as initiated by this report, is partially obsolete by the time it reaches the public, there is a compelling need for an ongoing planning procedure and system, representing all key elements of society. A quasi-public body, such as TRUST-EE seems ideal for such an ongoing planning task. The trust approach further permits the stimulation of the implementation of the plans, a point where many planning systems fail. A further benefit of a trust is that when its usefulness is over at some future date, it is more easily dissolved than a public agency. We strongly recommend that TRUST-EE be made operational by January 1, 1973.

"The rest of the recommendations of the full report comprise an initial working plan for environmental education in Massachusetts. They constitute a baseline for any environmental education planning system. They should help shorten the time lag between organization of a planning system and effective action.

"Effective broad-scale environmental education is long overdue. Each delay contributes to the magnitude of the problems to be overcome. Should our prime recommendation not be implemented, we hope that appropriate agencies in the state will implement such recommendations as fall within their area of responsibility.

"The recommendations are divided into several generally separate but inter-related categories—Elementary and Secondary, Higher Schooling, Public Non-School Education, Governmental Agencies, and General."

The Trust for Environmental Education was established in 1973 and gained its permanent tax exempt status in 1976. The Trust has had no success to date in finding funds for a full-time executive but has managed to achieve a measure of effectiveness with part-time project directors and volunteer input from its trustees.

A great amount of time has been spent in establishing a credibility with public officials and educational leaders. Given the turnover in public officials this has often been a frustrating task but has not been without its success. Unfortunately most of the work to date has been undertaken by the Trustees rather than the larger Advisory Council. This has been the necessary, although not the most desirable, route.

Projects of TRUST-EE to date have included the drafting of a comprehensive Environmental Education Act for the Commonwealth and its introduction into the legislative hopper for the 1976 session of the Legislature. The bill was maneuvered into committee, was almost rescued, but ultimately died in committee. In redrafted form, as several pieces of legislation, it will face the 1977 Legislature.

An extensive, practical course on the environment was developed for public officials and has been offered to planning board members, conservation commissioners, recreation commissioners and others in more than eight locations across the state with more than 300 graduates. TRUST-EE has acted as fiscal agent to get several projects established. One was a secondary school students' environmental organization, S.C.E.N.E., and another was a watershed study of a major urban watershed, the Charles, which was undertaken by an urban/suburban secondary student mix.

In addition the Trustees have played a gadfly role in promoting environmental education. Over two thousand copies of the initial report Environmental Education in Massachusetts were distributed around the state. Although state officials have done little formally to push EE until very recently, many groups accepted many of the recommendations of the report and have moved ahead to implement them on their own. Evidence of this can be seen in the 4-H and Extension Service, a number of private organizations, museums and zoos. In addition, recently movement is beginning in the State Department of Education and to a lesser extent in higher education.

It is hoped that a follow-up study can be undertaken soon to determine exactly what has been accomplished in the years since the original report was written so that clearcut priorities can be established. A strengthening economy would help TRUST-EE and others move forward with EE in the state.

A great deal must be done but it takes semi-public pressure on all levels of society to accomplish the tasks. A planning structure like TRUST-EE can be a force to accomplish this.

WESTERN REGIONAL ENVIRONMENTAL EDUCATION COUNCIL

by Rudolph J. H. Schafer*

When the sun rose on the environmental decade in 1970, it found the states comparatively under-manned in the primary agencies concerned. In the Office of the Chief State School Officer, there was, at best, a science education specialist with a bent toward conservation, and in the State Resource Management Agency, an information specialist with a bent toward education. The two did not necessarily talk to each other; in some cases they did not even know each other. Such at least was the typical situation in 13 Western states. Into this challenge stepped Rudy Schafer of the California Department of Education. First with modest state and private funding and later with a federal grant, there emerged the Western Regional Environmental Education Council, its purpose to facilitate intra- and inter-state communication and action. How it has done so, principally through the cooperative production of materials and sponsorship of training workshops, is the burden of this blow-by-blow case study. That the WREEC has had a constructive impact, not only in its area but throughout the country, is testimony to the catalytic individuals whose concept it was and who have carried out its promises.

SCOPE

The major thrusts of the Western Regional Environmental Education Council are elementary and secondary education programs and activities at the state level as conducted by state departments of education and resource management agencies and coordination of such programs on a regional basis. Secondary target areas include higher education, particularly in the area of teacher training, and informal public education programs in cooperation with appropriate community agencies. Since one of the purposes of the organization is to strengthen and improve the skills of members, the organization also serves to educate state governmental employees.

PURPOSE

As originally written, the USOE Title V, Section 505 project proposal stated the purposes of the project to be:

-- Helping each state department of education from the 13 member states develop an environmental education program which was to include roles, responsibilities and administrative mechanisms.

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- -- Helping each state develop an environmental education plan for its principal resource management agency.

- -- Working with the member states to set up formal and informal working relationships between the education and resource management agencies in each member state.

- -- Setting up linkages which would lead to informal and formal cooperative and coordinative activities among the 13 member states.

As the project progressed, most of the member agencies and the group met these initial objectives, so another set gradually evolved. These included:

- -- Providing programs and materials through the Council and in cooperation with other agencies for distribution and use in the 13 western states.

- -- Setting up working relationships with state agency groups in other regions of the country, federal agencies, and private conservation associations.

- -- Providing educational opportunities for members through which they might strengthen and improve their skills.

- -- Exchanging materials and information, expertise, and state level programs and activities for the benefit of the members.

FUNDING

WREEC began through an informal exchange of letters and phone calls among state level environmental education personnel initiated by Rudy Schafer, Environmental Education Coordinator for the California Department of Education. This exchange resulted in the calling of a meeting which was held in San Francisco in November of 1970. The California Department of Education provided some financial assistance to set up the meeting, and state travel funds enabled delegates from a number of western states to attend. The Ferguson Publishing Company also provided financial assistance for this first organizational meeting.

In June of 1971, a $150,000 grant was obtained from the U.S. Office of Education through ESEA Title V, Section 505, to fund a three-year project based on the objectives stated above. The grant was to provide travel funds for two representatives from each of 13 western states, permit the funding of various projects and activities the group might wish to conduct, and to cover administrative and other project-related expenses of the sponsoring state, California. Later, the project was rewritten to run for four years with no increase in the overall funding. The federal project was completed in June, 1975.

In 1973, a non-profit corporation was set up to enable the organization to continue its operations after the federal project expired. Members and associate members pay $10 per year for membership in WREEC, Inc. Additional funds are obtained through projects the organization conducts for various organizations. Additional funding sources are being sought to enable the organization to continue operation.

TARGET AUDIENCES

The California experience was typical of that in many of the western states. The primary interest in conservation and environmental education centered in the state resources management agencies. For some time they had realized that all successful resource management and environmental improvement programs and activities were very much dependent on informed public support. For this reason most such agencies have public information and education functions, which in most cases involved dealings with schools. Since most resource agency public information offices are not trained teachers, their effectiveness has sometimes left something to be desired.

The education community, including state departments of education, does not usually place a high priority on environmental education. In the case of California, the Department of Education did not have a full-time professional staff member working in this area until 1968, although the Resources Agency and the Department of Fish and Game both had full-time education staff members since the late 1950's. Since 1968, a push for requiring environmental education in the schools, the full-time Department of Education staff position, even program funding, were strongly supported by the Resources Agency.

Ideally, a state environmental education program should be a cooperative venture including both the state department of education and the resources management agencies; if possible, it should relate to similar projects and programs in neighboring states. This was the concept upon which the WREEC project was established. Thus, the primary target groups became state departments of education and resource management agencies of the 13 western states.

DETAILED HISTORY

In November of 1970 a meeting of state-level personnel from departments of education and resource management agencies having responsibilities in the field of conservation and environmental education was held in San Francisco. Seven states, several federal, state, and national resource management agencies, and the United States Office of Education were represented.

At this first organizational meeting, it was determined that regional cooperation in conservation and environmental education would be of value to the western states, and an ESEA Title V, Section 505, project was developed to facilitate such cooperation.

A three-year, $150,000 project, developed by Rudy Schafer with Dr. David Phillips of the United States Office of Education, was accepted for funding in June, 1971. The objectives of the project were to:

-- Assist the participating state education and resource management agencies in examining the status of conservation/environmental education within the state and to identify roles, relationships, the responsibilities for the program.

-- Assist state educational and resource management agencies to improve the effectiveness of their environmental education program through intrastate cooperation.

-- Assist state educational and resource management agencies to improve the effectiveness of their environmental education program through cooperation with other states and with the United States Office of Education.

The first meeting under the Section 505 project was held in San Francisco in July, 1971. The representatives from each of the 13 western states, as well as many educators and interested citizens, attended. To highlight:

-- A discussion was held on the basic goals and objectives of the project as stated above. Essentially, these consisted of helping each state set up programs in the state education and resource management agencies, and setting up regional cooperative programs and activities in cooperation with the U.S. Office of Education.

-- Environmental education programs offered by each of the agencies were reviewed briefly. Materials were exchanged, and a summary of each report was prepared for dissemination to members.

-- Dr. Paul Brandwein, President for the Center for the Secretary of Instruction, spoke to the group on his work in the field.

-- A discussion of possible Council projects and activities was held and it was recommended that the Council conduct:

    - inservice meetings for Council members;
    - local pilot programs which could serve as region-wide models;
    - an inventory of state and regional environmental education materials and human resources together with a plan for maximum utilization of these resources;
    - regional studies of specific environmental problems such as air and water pollution involving a variety of agencies;
    - an environmental education testing project.

The Council met in Tucson, Arizona in January 1972. A great deal of time was spent in listening to reports by representatives of various governmental and private agencies. Although the information presented by those speeches was of value, the overall effect on the participants was questionable. The time would have been better spent in activities which would have strengthened working relationships between members. Outside agencies which made presentations at the Tucson meeting included:

- Environmental Protection Agency
- National Park Service
- U.S. Office of Education, Environmental Education
- U.S. Job Corps
- Environmental Education Advisory Committee (USOE)
- U.S. Forest Service
- President's Council on Environmental Quality
- ERIC Information Analysis Center for Science, Mathematics, and Environmental Education
- Western Institute on the Commission for Higher Education Desert Museum
- New York State Department of Education
- Tucson Environmental Volunteers
- North Carolina Department of Education

Bill Dillinger, California Resources Agency, arranged a number of small group work sessions based on suggestions from Council members following the last general meeting. The following topics were discussed:

-- How can we handle student visits to parks, forests, and fish and wildlife areas, so that students get the most from these visits as a learning experience?

-- Should resource agencies provide educational facilities on their lands? If so, what kind, and how should they be operated?

-- What procedures can we develop to provide review of proposed school textbooks by resource people to insure adequate treatment of environmental concerns?

-- What are practical projects which school groups can do on resource agency lands?

-- How can educators work with resource people to do teacher training?

-- What are the sources of money for funding environmental projects?

These small group sessions were quite successful. Council members felt that this type of activity was preferable to listening to representatives and guests.

Action items from the Tucson meeting included:

-- Setting up a mini-grant program and requesting that Council members prepare proposals for possible Council funding.

-- Setting up a committee to review textbooks and other materials relating to environmental education to determine what the Council could do to improve their quality and to encourage their effective use in the schools.

-- Informal discussions with representatives of the American Forest Institute on possible cooperative activities with WREEC.

Activities at the Council meeting held June 1972 in Seattle, Washington:

-- Separate meetings of the resource management and education representatives to discuss problems of their specific areas of expertise were held.

-- All members participated in the U.S. Forest Service Environmental Education workshop conducted by Ernie and Charlene McDonald and Jim Unterwegner. The Weyerhauser Corporation also assisted with the activity.

-- The Council approved the following projects for mini-grant funding through ESEA Title V project funds:

1. Superintendent of Public Instruction, State of Washington. Contractor will work with appropriate state resource management agencies in developing a planning model through which the agency can become involved in state and local conservation education activities. The model will include detailed materials inventories, curriculum development materials, teacher training activities and projects, and techniques of program evaluation, and will show how state education and resource management agencies can work together to develop efficient statewide programs. Much of the professional and non-professional work will be contributed, and the result will be a manual and progress report showing how the project progressed and how it might be replicated in other states. Grant: $3300.

2. Alpine School District, American Fork, Utah. Contractor will develop a multidisciplinary curriculum to study local water supply problems at the secondary school level. Project will involve school district personnel plus appropriate educators from Brigham Young University. Charts, transparencies, films, and other materials will be developed stressing a problem solving

approach. Pre and post evaluations will be made based on student performance. Grant: $5000.

3. Oregon Board of Education, Salem, Oregon. Contractor will develop a pupil-teacher handbook suitable for use in grades K-14 describing in detail some 70 environmental education encounter lesson plans. Specific learning objects, vocabulary, activities, materials required, and pupil evaluation techniques will be covered. Grant: $1500.

4. Alaska State Department of Education. Contractor will assemble and edit a number of curriculum development plans, simulation games, and other materials (total over 500 items) developed by educators throughout Alaska in state department of education-sponsored workshop sessions. Grant: $1200.

5. Northern Colorado Educational Board of Cooperative Services, Boulder, Colorado. Contractor will develop and field test in seven locations a plan through which teachers, students, administrators, and community members work together to plan and conduct community-wide environmental education programs. Other programs could be set up in other localities. In addition, contractor will produce case history reports on each of the seven projects conducted citing specific accomplishments, problems encountered, evaluations, etc. A number of community and professional organizations will assist in conducting the project. Grant: $2000.

6. Jefferson County Public Schools, Lakewood, Colorado. Grantee will produce a handbook showing how environmental impact studies may be developed using students, teachers and various community agencies and individuals in the process. A workshop kit will also be developed to instruct teachers in how to conduct such a study. These materials will be field tested in the Jefferson County Outdoor Lab School and a case history written. Grant: $2780.

7. School District No. 1—Conservation Center, Lander, Wyoming. Contractor will develop a package of environmental education study materials based on a statewide project now underway in Wyoming. The materials will be multidisciplinary, will cover a number of grade levels, and will be printed on key cards. The materials will be field tested and an evaluative report made. Grant: $1500.

All of the projects were later completed with the exception of the Colorado project on environmental impact studies. The agency was unable to complete the project and returned the funds.

A discussion which led to the production of a set of guidelines on the development of state environmental education plans was led by Dave Kennedy, Washington Department of Education.

February 1973, Santa Fe, New Mexico Meeting Highlights

-- Informational reports were presented by Council members and various outsiders on environmental education programs and activities.

-- In-service training included a one-day visit to an outdoor school conducted by the Albuquerque Public Schools and a study on environmental education activities in New Mexico by the U.S. Forest Service.

-- The Alliance for Environmental Education. The Council voted to join the Alliance for Environmental Education which had just been founded by a group working through the Conservation Education Association. The purpose of the Alliance was to bring together a number of organizations which conduct regional or national environmental education programs to work on problems and concerns of mutual interest.

-- Environmental Education Act. A report was prepared and approved by the Council expressing concern over the implementation of the Environmental Education Act (PL 91-516) by the U.S. Office of Education. WREEC members requested that the EE office work more closely with appropriate state agencies in administering their program and that adequate field services can be provided. Rudy Schafer later testified, representing WREEC, at the hearings conducted Congressman Brademas.

August 1973, Jackson, Wyoming Meeting Highlights

-- Energy and Man's Environment. A group of power companies in the Pacific Northwest working with a group of educators headed by Dave Kennedy, Washington Department of Education, developed an energy education program which included teacher training, classroom materials, and technical assistance. Information on the program was presented to WREEC members. Several member states showed an interest in participating. Through the Council, four states were added to the Energy and Man's Environment group.

-- Incorporation. In order to continue the work of the organization after the federal project expired, the group decided to incorporate as a 501-C-3 non-profit corporation in the state of Idaho. This organization also made it possible for WREEC to contract for services and seek grants from various public and private agencies. Officers of

WREEC, Inc. included Dave Kennedy, President; Dick Hess, Vice-President; Rudy Schafer, Secretary; and Harry Mills, Treasurer.

-- American Forest Institute. Phyllis Rock, Education Director for the American Forest Institute, asked that the Council consider developing a program for AFI similar to the Energy and Man's Environment package developed through the Washington Department of Education. The Council approved this request, and agreed to work out a detailed proposal with Ms. Rock. Dave Kennedy, Bob Hernbrode, George Ek, Alan Wheeler, and Dave Phillips agreed to assist. (See "Project Learning Tree" case study, pp. 231 ff.)

--Materials Guide. Council members began development of a guide for the production and use of environmental education materials, to be sponsored as a WREEC publication.

January 1974, Sparks, Nevada Meeting Highlights

-- State informational reports were presented by all members attending, and summaries included in the Council minutes.

-- An in-service day was sponsored by the Nevada State Department of Education. The department was working on a program which relates environmental education to Nevada history, and WREEC members had an opportunity to participate in this program.

-- Several reports were received from representatives of federal agencies including EPA, BLM, and the Soil Conservation Service.

Following the presentations by federal agency representatives, the Council discussed relationships among those agencies, departments of education, state resource management agencies, and local school districts. Services available from federal agencies vary from place to place depending on the interest of the local representative. Agency operational mandates sometimes restrict services which may be offered and hinder interagency coordination and cooperation. A national policy statement on environmental education from the President's Council on Environmental Quality or similar high level authority might be useful in helping overcome the reluctance of some agencies to participate in environmental education activities and could help to coordinate programs as well.

In one of its earlier meetings, the Western Regional Council had drafted a letter to be sent to a number of Federal Resource Management Agencies requesting their support for local environmental education programs. It was suggested that another communication of this nature be prepared and sent out as appropriate, and that Council members be supplied with replies to use at the state and local levels as needed.

The group met for the first time as Western Regional Environmental Council, Inc., a non-profit corporation, to discuss contractual arrangements with the American Forest Institute and Educational Research Systems, Inc., of Seattle to develop environmental education materials stressing forest conservation. Subcommittees developed guidelines which will be incorporated in a contract among the three organizations. A Project Learning Tree committee chaired by Dave Kennedy undertook the development of a formal contract based on the recommendations of Council members, and has served as direct liaison among the three organizations throughout the life of the project.

Needs Assessment. A questionnaire was sent to all Council members in an attempt to pinpoint specific environmental education needs upon which the organization might concentrate our efforts. The following needs were identified and discussed:

-- How do we get teachers to use the outdoors as a teaching resource?

-- How can we secure stronger public support for environmental education?

-- How can we encourage better communication among educators, resource management agency people, and the general public?

-- How do we get state department of education support for environmental education? Funds? Personnel?

July 1974, Portland, Oregon Meeting Highlights

-- In-service training activities included visits to the Portland State University Environmental Education Center, the Oregon Museum of Science and Industry, the Oregon Forestry Center, and the Trojan Atomic Plant on the Columbia River.

-- Five WREEC states indicated that they were using the Energy and Man's Environment program in their states.

-- Progress reports were received and evaluated on Project Learning Tree. The contractor presented a curriculum framework which had been worked out with WREEC members, local educators, and foresters. Writing workshops were authorized and the first draft of the curriculum grades was drafted for completion by January 1, 1975.

Two Council publications, Resources Guide and Use This, were reviewed by members at the meeting. Those two publications were developed by a Council subcommittee chaired by Dick Barnhardt, WREEC representative of the Hawaii Department of Education. Resources Guide was written to provide materials for classroom use, while Use This is directed at classroom teachers to assist them in making effective use of the great variety of free and inexpensive materials available from a variety of sources. A limited supply of the books was distributed to members, and copies entered into the ERIC system.

July 1975, Honolulu, Hawaii Meeting Highlights

-- A series of seven workshops was conducted by WREEC members for approximately 100 teachers from the Hawaii state school system. Workshop sessions included:

- Washington state program for junior high schools environmental study areas covering urban and rural limits.
- The school as an ecosystem; process approach to wildlife and water studies (Oregon and Idaho).
- Inquiry and value seeking strategies in environmental education as developed by the Santee (California) School District.
- Environmental education curriculum development (Colorado and Wyoming Departments of Education).
- Man and his Environment demonstration and ideas and techniques as developed by Arizona Department of Game and Fish.
- Environmental education in social studies, health and art education—Federal projects in this area.
- The Essentia Project as developed at Evergreen State College, Washington.

-- Project Learning Tree. The materials produced through the project were received by Council members, and recommendations for revisions were made. Each WREEC member undertook the development of a state plan for inception of the program in his state. Materials were to be distributed through workshops only, with AFI funding and assistance for those activities. State coordinators agreed to assist in managing the program in their areas.

-- In-service training activities included a two-day study of the environmental problems of Hawaii plus a study of its proposed environmental education program. Hawaii has a state school system and works closely with the state university in developing curriculum and providing teacher training. WREEC members provided input for the program, and individual members will be contacted later for further assistance.

July 1975, Snowmass, Colorado Meeting Highlights

-- The Western Regional Environmental Education Council jointly sponsored with the Alliance for Environmental Education a conference to develop a national status report, together with goals and objectives in a number of specific fields of environmental education interest and expertise. The conference was held from July 6 through July 9, and most WREEC members participated. In addition to a panel on state organizations chaired by WREEC President, Dave Kennedy, meetings were held to discuss elementary and secondary school programs, higher education, federal agency programs, business industry and labor programs, private citizen groups, and various other issues of major concern.

-- The conference proceedings were later published in two volumes: Perspectives and Prospectives: Key Findings and Major Recommendations and Perspectives and Prospectives: Supporting Documentation by ERIC/SMEAC.

-- Western States Water Council. This organization consists of representatives of state level water management agencies in eleven western states and works to coordinate programs on a regional basis. Discussions have been held with Mr. Jack Barnett of the Council concerning a joint educational project with WREEC which will help students to understand the technical nature of water management, as well as the social, political, economic and other effects of these programs on the lives of people. A committee consisting of Dick Hess (Chairman), Meyer Bogost, Harold Wik, George Ek, Jack O'Leary, Cliff Hamilton, and Joe Vogler was appointed to work with WSWC and develop a project proposal. WREEC will supply technical expertise for the project, and will provide a means of distributing materials and field testing in the western region.

-- WREEC Publication, SATISFICE. Through a WREEC mini-grant to the Washington State Department of Education, Dave Kennedy has developed a publication to assist resource management personnel in working effectively with schools. The publication titled Satisfice was reviewed by Council members and the consensus was that the publication contains useful information presented in an interesting and concise manner, which will be of great value to a variety of people who deal with schools. Although the typography and art work were covered by the mini-grant, there were not sufficient funds to print Satisfice in quantity.

A discussion was held concerning the printing of *Satisfice* and two other Council publications *Use This* and *Resource Guide* which might be sold to raise funds for the continuation of the work of the Council. Funds were obtained later to print a number of copies of *Satisfice*, and they have been widely distributed. No other Council publications have been reprinted.

-- *Project Learning Tree*. The two curriculum guides on forest conservation developed through a grant to WREEC by the American Forest Institute were reviewed by the Council and found to be quite well done.

-- A discussion was held with June McSwain of AFI as to the next step for the project. Dave Kennedy agreed to a proposal for AFI embodying the following features:

1. Each of the 13 WREEC state representatives will develop an implementation plan through which the materials might be extensively field tested and evaluated.

2. A workshop format will be developed and training sessions held throughout the region. Workshops will involve educators, representatives of the forest industry, and others as appropriate, and assistance will be provided to assist industry representatives in working effectively with the schools.

3. The teaching materials will be revised in the light of information and evaluative data gained during the field testing.

4. Working relationships will be developed with state education and resource management agencies in other parts of the country in order that the materials might be distributed and used nationally.

-- *WREEC, Inc*. In order to carry on the work begun under the Title V project, members of WREEC have incorporated as a non-profit corporation in the state of Idaho. Personnel with state level environmental education responsibilities may become members of WREEC, Inc., while anyone with a professional interest in the field may become an associate member. Regular and associate members pay $10 dues per year. Through funds already on hand and anticipated revenue from future projects, the continuation of the WREEC organization seems assured. WREEC is interested in coordinating programs regionally and nationally, as well as providing direct assistance to members and developing programs and materials of value to the field. WREEC will continue its membership in the Alliance for Environmental Education, and Rudy Schafer will serve as WREEC representative. Richard Hess, Colorado Department of Fish and Game, was elected President of WREEC.

-- Conclusion of ESEA V Project and Evaluation. The ESEA project concluded after the July, 1975 meeting, and members were requested to submit a written evaluation of the program and its value to them personally and their organizations. A summary of the information obtained through this questionnaire is included under the section on evaluation.

February 1976, San Francisco Meeting Highlights

-- Western States Water Council Project. Meetings have been held with representatives of this agency, and plans are going ahead to develop school materials for use in the eleven western states.

-- Council Publications. Seven major publications were developed by the Council. These include:

1. Lander (Wyoming) Environmental Education Task Cards. Learning experiences in environmental education for elementary grades developed by the Lander, Wyoming School District.

2. Encounter with the Northwest Environment-Natural and Urban. A synergistic method for studying a variety of environmental phenomenon on a state or regional basis. Developed by the Washington Department of Education as a model to inventory environmental study areas on a statewide basis.

3. Use This. A guide for teachers and school administrators suggesting ways in which free and inexpensive materials supplied from a variety of agencies can be used effectively in an environmental education program. Developed by WREEC in cooperation with Essentia, the Evergreen State College, Washington.

4. Materials Guide. A guide to assist procurement of free and inexpensive materials for classroom use developed by WREEC in cooperation with Essentia, Evergreen College, Washington.

5. Satisfice. Developed to assist resource management people in understanding educators and the education profession, and making effective contributions to them.

6. Environmental Education in the Western States (1971).

7. Environmental Education in the Western States (1974). A survey of state laws, programs, personnel, etc. in the 13 WREEC states. Developed by WREEC and the California Department of Education.

Printing and selling these publications as a fund-raising activity for WREEC was discussed, but due to the difficulty in marketing them and the capital needed to produce the materials, it was decided to limit distribution to copies remaining on hand.

- Funds. The organization has funds on hand from various projects and can continue operation through the year. Additional funds must be found if the Council is to continue into 1977.

- Alliance for Environmental Education. The organization voted to continue its participation in the Alliance for Environmental Education, and will support and participate in the UNESCO Conference in St. Louis.

-- Project Learning Tree. An in-service training program for all WREEC members was conducted by Cheryl Charles, PLT workshop director. Members also discussed state plans for PLT implementation with June McSwain and other AFI representatives. A year-long pilot program is planned and will include evaluation by the University of Washington.

July 1976, Boise, Idaho Meeting Highlights

- Western States Water Council. Rudy Schafer reported on meetings with members of WSWC to develop a joint water education program. Apparently things are moving toward this end, but rather slowly due to lack of adequate funding. Dorrell Larsen, University of Idaho Extension Service, is familiar with the WSWC program and assured us that every effort is being made to move ahead with the water education program, and that WREEC will certainly be involved in its development and implementation. Rudy Schafer distributed copies of a plan which he developed for WSWC and submitted to their committee members. The fully conceptual outline was developed for this project.

  The following resolution relating to the water education project was approved by the Council:

  1. The Western Regional Environmental Education Council requests that ERIC/SMEAC submit a proposal to WREEC for the preparation of a package of educational materials on water which will include:

     - A selection of pupil-teacher materials for use in grades K-12.
     - Descriptions and other data on appropriate water education programs conducted throughout the nation.
     - A pupil-teacher bibliography.
     - Costs of the above materials and services, price to include one hard copy of all selected materials.

2. That a determination be made as to what WREEC funds could be committed to this project and that adequate funds be committed if available.

3. That a contractor acceptable to the Council be employed to assemble and process the ERIC materials and to develop a plan for further action.

-- State Coordinators Organization. The Council reviewed a proposal for a national organization of state environmental education coordinators developed by a group at the NAEE meeting in Atlanta in April. The Council favors the idea, but strongly urged that resource management personnel as well as educators be included in the new organization.

-- Project Learning Tree. Progress reports on the various state implementation plus were reviewed. The project has been well received by the field, and the workshops have been useful to teachers. Consideration is being given to reaching out to other states with Project Learning Tree during 1977.

-- Council Continuity. The Council voted to allocate a major part of incoming Council funds as follows:

1. Participation, Alliance for Environmental Education	$1000
2. Development of Water Education Materials.	$1500

Additional funds will have to be obtained if the Council is to continue. Approximately $10,000 per year is needed to cover meeting expenses, travel and per diem for members, and participation expenses. Assistance from private industry will be sought.

As a first step toward its development of Water Education Materials, WREEC is considering the following sample framework:

"We, the Western States Water Council, Western Regional Environmental Education Council and others believe that every informed citizen should understand how water affects the human and natural environment, and should participate in appropriate activities to conserve this and other natural resources. We further support an educational program for the schools which will help students understand that:

--"Water is essential to all human, animal and plant life.

--"Water quality and availability directly affect the physical environment and human health as well as all human institutions and activities.

--"Wise water management is essential to our continued social progress.

--"Water is connected to everything else in nature. Therefore, it cannot be understood or managed as a separate entity, unrelated to the rest of the physical or human environment.

--"Water has recreational, aesthetic, cultural, and inspirational values which contribute to the quality of human life.

--"Water is not unlimited; therefore, there are limits to what water management technology can do.

--"In water management, as well as in other environmental concerns, choices must often be made. People should have the necessary knowledge to understand the issues and make wise decisions on them.

--"The ultimate goal of water management should be to promote the highest and best quality of life for everyone.

--"There is much individuals, families, and larger social groups can do to conserve water. It is to everyone's advantage to develop and practice these skills."

July, 1976 to Present

Activities of the Council continue on an ad hoc basis. A number of members participated in the UNESCO Conference in St. Louis, the Water Education program continues, and WREEC membership and participation in the Alliance for Environmental Education is continuing.

Although a number of people have said WREEC is too good an organization to die, the financial pressure continues. Hopefully, funds will be found to continue the work of the organization.

EVALUATION

At the last official meeting as a federal project, WREEC members completed an evaluative questionnaire on the project. Some of the information gained through this activity is summarized below.

Did the WREEC project help you develop a stronger state program?

All representatives agreed that their state program benefitted from the participation in the WREEC project. The benefit most often cited was the exchange of materials, information and expertise. In one case, the WREEC project is credited with keeping a state program alive when consideration was being given to dropping it. A few of the mini-grant projects were of substantial and direct benefit to individual states. Several participants indicated that one of the most significant benefits to the program was in setting up working relationships between resource management and education people. In some cases, the two state representatives had never met prior to the WREEC project!

Did the WREEC Project result in better relationships with other states?

A number of cooperative projects were cited. Most of these were informal and ad hoc. Members felt that the one-to-one working relationships developed through WREEC were most beneficial. These relationships resulted in considerable informal cooperation and mutual assistance and will certainly continue into the future.

In your opinion, how successful was the mini-grant program?

In some cases the mini-grant programs were of great benefit to the recipient state. Most members felt, however, that the mini-grant program was not really very effective on a regional basis. One respondent felt that some states participated only in the hope of obtaining money. Council publications, Use This, Resources Guide, and Satisfice, were cited by most members as our most successful and useful products. In the opinion of the project director, it was a mistake to spend money on projects until the Council was a solid working unit.

Did the WREEC Project help you become more effective in your work?

Opportunities for individual growth were cited by most members as the most significant benefits of the program. Several respondents, particularly those from resource management agencies, stated that the WREEC project was the only opportunity they had for in-service training for their jobs. Nearly all respondents cited several specific ways in which their job effectiveness had increased through the project.

Of what benefit was WREEC in helping members learn about and participate in activities outside the region?

Most members benefitted from the information received through representatives from federal agencies, the Alliance for Environmental Education and cooperative activities with other states, but no significant involvement with other regions is cited. "Good to have the information, but I have enough to do at home" seemed to be what most participants were saying. Project Learning Tree was seen as perhaps the most significant development having national significance. Members felt that the project represented a new and innovative way of educators and the private sector working together for the benefit of students. At the July, 1976 meeting, WREEC members expressed an interest in participating in the proposed national network of state environmental education coordinators, but strongly urged that resource management people be involved in the program as well as educators.

In what ways did WREEC fail to meet your expectations?

"The project was slow in getting started, too much time spent in rabbit chasing." "I didn't find any magic answers, but perhaps there aren't any." "Project would have been better if all states had cooperated fully and sent the same representatives each time." "Too much time spent with outsiders and special interest speakers; more time should have been spent working with the basic member group."

Do you feel that the organization should continue?

Strong approval was expressed for Council continuation, and several specific ideas for funding offered. Most felt that a good working group had evolved, and that it is capable of further progress. Several members noted that they would sorely miss the opportunities to obtain information and materials on programs. For many WREEC members, the meetings were their only out-of-state environmental education travel opportunity. Outsiders have also expressed the opinion that WREEC should continue. "This is just too good an organization to see die," one representative of the forest industry commented.

Comments of the project director

In the opinion of the project director, the WREEC project was a success and the federal funds well spent. For a handful of members, the project was their big opportunity to learn and develop effective programs in their states. Our most important accomplishment was what we did for members—helping them gain information, develop materials, gain expertise, and improve their work-related skills.

Project Learning Tree may be considered a major success too, for it piloted a new method of materials production for industry, as well as an effective means of getting these materials into the schools.

Some of the other WREEC "products" were of value, some not. The publications, Use This, Materials Guide, and Satisfice were particularly valuable. Several of the mini-grant projects were of significant value to their states only. Most did not benefit the Council as a whole.

Getting the group together as a working organization took considerable time and could have been handled better. Most groups go through three stages in evolving into a working unit. First, is the "I" stage in which each individual is anxious to let others know who and how important he is. Next comes the "you" stage. Group members began to listen to and understand others in the group. Finally, but not always, comes the "we" stage in which the group of individuals becomes a solid working unit.

It took four meetings and nearly two years for WREEC to become a solid working organization, but it did happen, and everyone knew it. Perhaps the process could have been speeded up. Certainly the first meeting in San Francisco with a lecture by Dr. Brandwein and the Phoenix meeting with representatives of federal agencies making a pitch for their various programs were inappropriate—to say the least. First priority should have been given to getting a group rapport going. The outside input should have come after this was accomplished.

The diversity of individuals was another problem. The education representatives had for the most part advanced academic degrees, while several of the resource agency representatives were field men who had worked their way up through the ranks. At one point, members requested that the two groups meet separately so that they could consider specific problems in their areas of expertise. It took time to build up a trust relationship between the two groups, but it did happen.

Fortunately, this strong working relationship continues.

Of course, Project Learning Tree could not have been accomplished without this strong working relationship. AFI representatives attended several meetings as observers until it was clear to them that they could depend upon the group to produce something worthwhile.

This need for development as a working group before any real progress can be made points up a problem in initiating similar groups. Someone must fund the "breaking in" period and results cannot be guaranteed. At one point, a request for private funds to support WREEC during its developmental stage was greeted with the comment, "We just can't see sponsoring an annual reunion of bureaucrats."

It would have been difficult to have run the project without outside funding. Out-of-state travel policies vary from state to state and time to time, and it would have been nearly impossible to get the same group together twice a year for four years if we had been unable to cover travel and per diem. Perhaps this is an important role for the federal government to consider—facilitating interstate projects by providing travel and other meeting expenses. Certainly much can be done when groups such as WREEC can work together on a long-term basis.

WREEC had an input in the national environmental education program through the Snowmass Conference and the Alliance for Environmental Education. Many Westerners do not see themselves as part of the far-off Eastern scene, and this participation was useful for many of them. Although efforts to establish better working relationships with the Office of Environmental Education were unsuccessful, the WREEC project did have an effect on other USOE and federal programs in general. The working relationships which developed between the federal and state people at Snowmass was a most significant accomplishment.

In conclusion, it may be said that the WREEC project, despite some minor flaws, was a worthwhile activity which resulted in some real accomplishments for the environmental education programs in the Western states. The fact that the organization continues to function a year and a half after the federal funds were exhausted attests to the fact that its members and their supporting agencies consider the organization of real benefit.

The most important "product" of WREEC was and is people. Several, but not all, participants grew tremendously in skills and knowledge which led to greater job effectiveness. For these people alone and what they accomplished the project could be labeled a success.

The Project Learning Tree experience was another major accomplishment. It represents a new way of developing programs and materials through industry-education cooperation, and hopefully will be repeated elsewhere.

The exchange of materials between states and agencies was another significant accomplishment. At first, state representatives were a "show and tell" kind of thing. Gradually, they developed into give and take sessions in which problems common to all were discussed and active recommendations made.

In balance, WREEC did and will continue to make a contribution to the environmental education field nationally. Although the emphasis was on the west, several activities, such as Project Learning Tree and the Snowmass Conference, plus the fact that we did what we did and were successful at it, had an effect on the national scene. Hopefully, this effect will continue.

Members of Western Regional Environmental Education Council (Autumn 1976)

ALASKA:	Dolores Moulton, Department of Fish and Game
ARIZONA:	William R. Hernbrode, Game and Fish Department; Thomas Kennedy, Department of Education (Scottsdale Public Schools)
CALIFORNIA:	William Dillinger, Department of Parks and Recreation; Rudolph J. H. Schafer, Department of Education
COLORADO:	George Ek, Jr., Department of Education; Richard Hess, Division of Wildlife
HAWAII:	Meyer S. Bogost, Environmental Education Association of Hawaii, Inc.
IDAHO:	Michael Harned, Department of Fish and Game; Harry C. Mills, Department of Education (retired); Karen Underwood, Department of Education

MONTANA: Edward L. Eschler, Department of Education; Vincent Yannone, Department of Fish and Game

NEVADA: Jack O'Leary, Department of Education

NEW MEXICO: B. K. Graham, Department of Education; George Worley, U.S. Forest Service

OREGON: Cliff Hamilton, Game Commission; Claudia McDuffie, Department of Education

UTAH: Richard Peterson, Board of Education; L. Ray Remund, Division of Wildlife Resources

WASHINGTON: Russell W. Hupe, Department of Game; David Kennedy, Department of Public Instruction

WYOMING: Joan Catmull, Department of Education; William Futrell, Department of Education; Joe Vogler, Department of Fish and Game

ASSOCIATE MEMBERS: David Phillips, U.S. Office of Education; June McSwain, American Forest Institute; John Disinger, ERIC/SMEAC; James Graban, Boise Cascade Corporation.

Past Members of Western Regional Environmental Education Council

ALASKA: Robert Burnett, Department of Fish and Game; Lawrence Hill, Department of Education; Jay Massey, Department of Fish and Game; Jo Michalski, Department of Education

ARIZONA: Carl Beisecker, Department of Education; Robert Stonoff, Department of Education

COLORADO: Charles Holtzer, Department of Education

HAWAII: Richard Barnhardt, Department of Education

MONTANA: Dana Martin, Department of Education

NEVADA: Glen Griffith, Department of Fish and Game

NEW MEXICO: Norma Ames, Department of Fish and Game

OREGON: Wilmer Nance, Department of Education

UTAH: Le Mar Allred, Department of Education

WASHINGTON: Lynn Martin, Parks Department; Charles Odegaard, Parks Department; Lloyd Rowley, Department of Public Instruction

WYOMING: Ron Beiswerger, Department of Fish and Game; Robert Larson, Parks Department; Alan Wheeler, Department of Education.

THE ROLE OF THE MASS MEDIA IN ENVIRONMENTAL EDUCATION

by Clay Schoenfeld*

Everybody now knows we are in the middle of an era of tough environmental action, different in distinctive ways from the age of polite conservation of yesteryear. Our national resource management agenda had changed markedly in just a decade. What may not be generally realized, however, is the educational role the mass media have played and are playing in reflecting and shaping the changing American mind.

Such a role is typical of our society. Public issues first surface and public options are first outlined in communication media before the problems enter the general ken. Few shifts in American thought have been so swift and dramatic as the switch from conservationism to environmentalism that bellwether periodicals fostered between 1965 and 1975. This paper is an analysis of that evolution.

Cultivating more concern for the environmental consequences of society's activity is becoming a national goal. Hence, environmental communications programs and projects are growing in number and size. The scope and velocity that characterize this development are little short of stunning. Yet conservation and communication in America have been for many years symbiotic.

THE CONSERVATION/COMMUNICATION ALLIANCE

When Gifford Pinchot set about staffing his embryo U.S. Forest Service in 1898, the first crewman he hired was not a ranger but a writer. Support for the emergence of the Forest Service itself had been generated in part by enterprising newspaper reporters exposing the excesses of the lumber barons of the day. It was ever thus. Communication has been the handmaiden of conservation. Look at the careers of the leaders recorded in Professor Douglas Strong's (1971) book, The Conservationists, for striking examples of the role of communication in conservation.

Henry Thoreau was a sometime pencil-maker and quasi-hermit who found his calling as a great writer. Frederick Law Olmstead, pioneer landscape architect, early turned to writing to promote his city planning concepts. George Perkins Marsh, the epitome of the Renaissance man—

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lawyer, farmer, manufacturer, congressman, diplomat—is best known today as a landmark author. John Wesley Powell personally publicized his classic explorations in newspaper articles and books. John Muir might have whittled away his days as the "tramp" he said he was if he had not entered into a remarkable alliance with a leading magazine editor of the day. Stephen Mather came to his National Park Service from a background as newspaper reporter and soap salesman. Aldo Leopold was early on the secretary of the Albuquerque, New Mexico Chamber of Commerce and the writer of innumerable pamphlets. FDR turned to novel radio chats to sell his CCC, SCS and TVA. Stewart Udall's pen helped his fellow Americans discover the "quiet crisis." Pinchot may have been the premier communicator of them all. Author Strong calls him "a shrewd manipulator of public opinion . . . Through a stream of press releases and speeches, and by active lobbying in Congress, he carried his crusade for 'practical forestry' before the American people."

THE MASS MEDIA AND ENVIRONMENTALISM

In many respects the mass media of communications have been the midwives of the modern environmental movement. With respect to magazines, devoted publications like American Forests, Audubon, Field and Stream, and Sports Afield began exploring the broader dimensions of conservation as early as the 1940's. In the 1955-1965 decade, major magazine articles on conservation issues increased nearly sixfold, typified by Saturday Review's 1965 issue on "The Crisis in Water." Not in their wildest dreams, however, did pioneer environmentalists anticipate that all the big general-circulation magazines would ever devote virtually simultaneous whole issues to ecology. Yet that is exactly what happened in the five months of late 1969 and early 1970. Triggered by Earth Day, Time, Life, Newsweek, Look, Fortune, Saturday Review again, Sports Illustrated, Esquire, National Geographic, and others joined the bandwagon.

These printed messages were orchestrated by famous electronic voices like those of Walter Cronkite, David Brinkley, Ed Newman, and Hugh Downs. By 1972 Arthur Godfrey's "Portable Electric Medicine Show" had probably reached the ultimate in translating ecology into the language of TV. The film makers were not to be outdone. Starting in 1969, new movies, strips, and slides began to flash the environmental message on all manner of screens.

Environmental paperbacks were exploding, too. The forerunners had been Leopold's Sand County Almanac in 1949, Carson's Silent Spring in 1962, Udall's Quiet Crisis in 1963, the Rienow's Moment in the Sun in 1967, and Ehrlich's Population Bomb in 1968. Again Earth Day blew up a veritable wave of titles, cresting in a Ballantine/Friends of the Earth series with such best-sellers as The Environmental Handbook and Earth Tool Kit.

Except for the columns of so-called outdoor writers, newspapers were comparatively slow to latch on to the environmental story in a comprehensive manner, but by 1971 the picture was different: several daily reporters had won Pulitzer prizes for environmental journalism, environmental issues topped the list of editorial topics around the country, the bylines of specialized environmental-writers were appearing regularly on the front pages and in feature sections, and an Academy of Environmental Writers was even formed in Washington, D.C. (Emery, 1972).

It can probably be said, as Stanford alumni David Rubin and David Sachs (1971) have, that "the mass media, while successfully drawing the broad outlines of environmental problems in the United States, have continually failed to provide the specific, hard-hitting information the public needs to do something about these problems." On the other hand, it can probably be said, as Thomas F. Williams (1971), assistant director of public affairs for the national Environmental Protection Agency, has, that "at the level of arousing public awareness, what the mass media have accomplished is close to miraculous in bringing to citizens scientific and social knowledge heretofore known to only a few experts."

In a nutshell, from the perspective of history there have been few more dramatic examples of the response of a free mass media to a public issue than the eruption in environmental news in the 1965-72 era. At its best, environmental reporting has set new journalistic standards in scope and intensity. At its worst, it has merely revealed those perennial shortcomings in personnel education and perspective that haunt any enterprise with something less than a total devotion to staff training, merit pay, the public's right to know all facets of an issue, and agenda-setting.

THE AGENDA-SETTING ROLE

Agenda-setting is that function in which media take a lead in placing before the public an emerging issue or a changing slant on an old issue, rather than in merely reporting or "covering" issues and actions already clearly in the public ken. Typically this function is performed initially by specialized periodicals aimed at particular "innovative" audiences. Most if not all intellectual movements or political positions in this country have had their parameters sketched and their doctrines cemented in such fashion before they enter the arena of the mass media.

It was the explosion of a new array of specialized journals in the 1960's that really focused attention on environmental affairs: Environment, Environmental Action Bulletin, Environmental Action, Earth Times, Clear Creek, Environment Monthly, Ecology Today, ZPG, Environmental Quality, The Journal of Environmental Quality, Environmental Science and Technology, Earth Watch, Not Man Apart, Environment and Behavior—it took a new bibliographic service, Environment Access, just to keep up with these new media of public education.

Today some environmental periodicals have faded from the scene and those remaining are hard-pressed to stay ahead of the New York Times, Newsweek, CBS, and the like in surfacing environmental rationales and issues. A reader of the Lewiston, Idaho Morning Tribune is as apt to be called to attention by an editorial on strip-mining as is a follower of Washington, D.C.'s Environmental Action newsletter. In short, in terms of environmental affairs, the agenda-setting role of the media has become broadly diffused, to the end that environmental education everywhere has a highly-visible data base for discussion.

The extent to which environmental coverage has metasticized throughout the media is little short of stunning. Whereas ten years ago, for example, the term would have been literally Greek to its editor. the cover and eight pages of a recent issue were devoted to "ecology" in—get this, The National Real Estate Investor (Yannecone, 1975). It was very objective reporting, too. Such diffusion of the word has brought an early death to some of the upstart environmental periodicals; many others continue to flourish in well-established ecological niches, as it were. The most complete and current directory now lists 93 old, new, or retreaded periodicals that deal substantially with environmental issues broadly defined (Metress and Metress, 1976).

The mass print media attention continues. The number of articles on wildlife listed in the Readers' Guide to Periodical Literature actually rose from 27 in 1971 to 55 in 1975. Today it is perhaps of telling significance that in James A. Michener's latest book, Centennial, an ecological novel if there ever was one, the hero is a defender of "primitive areas held inviolate." Paul Garrett, fictional Deputy Commissioner of Colorado Resources and Priorities, tells Vail developers: "If you want new ski runs along the highway to make the rewards of nature available to more people, I'll support you, but, on your plans to commercialize the back valleys, I'll oppose you to the end." Thus is the environmental ethic now expressed in a current best-seller. Hopefully the coming movie version will treat the theme with finesse.

The tremendous potential of the audio-visual media in environmental education has been relatively untapped. True, we have the superb natural history films of Jacques Cousteau and others of his calibre, but their net message is not always didactic enough to energize action. Commercial television gives sporadic attention to environmental issues, real and imagined, but there is nothing like the consistent coverage in depth the subject demands. Yet to emerge are the script writer-cameraman teams that can translate a Sand County Almanac into prime-time drama. Perhaps they are already waiting in the wings for the necessary subsidy the Council on Environmental Quality could provide for a PBS series that would capture America as did Upstairs, Downstairs. A prototype may be the state of Maine's current PBN programs about "The Land and Me."

The continuing role of the mass media in environmental education is not without its problems; the shortcomings of biased public agencies and private experts as news sources, the bias of the reporter himself, the political and economic pressures that accompany environmental disputes, the highly technical data that can easily be lobbed over the reader's head, and the pervasive problem of making a coherent concensus of choices out of bits and pieces of conflict (Pryor, 1971). The editor of Time has recently characterized quality environmental reporting as the most difficult and demanding of all press assignments (Jordahl, 1976).

Perhaps nothing has so changed the face of environmental coverage in the mass media as has the requirement of the National Environmental Policy Act for the development of environmental impact statements on federally-funded projects, accompanied by related requirements in many states. The "102" statements have automatically provided two basic "news" ingredients--they are events that are happening now, and they have a high component of conflict. So they have become grist for the media mills. When they have prompted court suits and countersuits, they have doubled and quadrupled both the quantity and the quality of media coverage. Some critics may call environmental impact statements a psuedoscientific "boondoggle" (Schindler, 1976), but at least they have opened resource management decision-making to some public scrutiny.

Before NEPA, the environmental reporter was like a sports writer restricted largely to "think pieces" because there were very few "games" actually to cover. With NEPA, the environmental reporter has a vastly escalated number of points of entry to his running story on environmental issues and actions. It is unlikely that any other single Federal act has had such an inadvertent yet nonetheless profound impact on the flow of news on a particular aspect of public affairs.

Within the organizational framework of the media themselves, NEPA has had a related impact. Whereas yesterday the conservation/environment story was largely the domain of agricultural, outdoor, or science specialists, depending upon the slant, today the environmental story is popping up on everybody's beat. Capitol, court, courthouse, city hall, education, business, women's page, finance, health—almost any beat is apt to involve a story with an environmental aspect (Witt, 1974). As a result every reporter has had to become conversant with issues and options. In the meantime we have also seen emerge on the larger dailies, magazines, and networks a sophisticated environmental specialist who makes no attempt to cover the breaking news of the day, whatever its source, but who concentrates rather on in-depth interpretive or investigative reporting (Griffin, 1976), as he or she tries to elucidate the economic, ecological, esthetic, and engineering aspects of the complicated subject they are covering.

In the presence of relatively objective environmental specialists on the media, it is increasingly difficult today for either side of an environmental issue to dominate news columns or air time. Environmentalists, being a relatively impecunious lot, have had to expend their limited resources largely on rifle-type communications to selected public-opinion molders. Business and industry, on the other hand, have fewer fiscal problems. The result is a continuing employment of shotgun institutional advertising in newspapers and magazines and on television to impart a "backlash" message. Some of this advertising is relatively soft-sell; some has all the finesse of a meataxe. Whether any of it changes any hearts or minds we have no Nielsen rating to indicate.

A CASE STUDY OF THE CHANGING VOICE OF THE ECOLOGICAL CONSCIENCE

Few shifts in American thought have been so swift and dramatic as the switch from conservationism to what has become known as environmentalism. The broad distinctions are relatively clear. Conservation was a collection of special interests, each of them narrow in scope: wildlife husbandry, water development, land conservation, forest protection, park management, and so on. Then environmentalists began to realize that everything really is connected to everything else. The focus of conservation was on disappearing redwoods and raptors. Environmentalism says the most endangered species is humankind itself. In terms of its locus, conservation carried a connotation of open country. Its universal symbols were Smoky Bear, a Canada goose, and contour plowing. Environmentalism has brought a conservation conscience to bear on the foul air and fetid water of the central city. Conservation was allied with orthodox causes--progress as our most important product, depression pump-priming, national defense. Environmentalism says that less can mean more, particularly in terms of human population levels--hitherto a very un-American point of view. Above all, conservation had confined itself too much to leisurely "letterhead pieties and convention oratory" (Leopold, 1947). Environmentalism has brought a sense of urgency and a set of brass-knuckles tactics to match.

All of this evolution is typified in the changing contents of a representative environmental magazine, National Wildlife. To follow that changing voice is to gain insight into the environment of environmental education today.

The December-January 1966 cover said National Wildlife was "dedicated to the wise use of our natural resources," the definition of conservation propounded by Pinchot 60 years before. The issue featured an innocent illustrated article on "Wildlife in Our Christmas Legends," and "An Inspirational Message from Dr. Norman Vincent Peale." The Reverend Dr. Peale asked us to "love God's law" by "experiencing the magic of nature daily." We could do so even in the city, he said: "One morning in New York between two appointments I stood for a long moment watching the ripples of the East River sparkling in the sunshine. The scene gave me such a lift that it affected the whole course of the day." No hint here that the river at the time was one of the most polluted in the world.

Louis S. Clapper's "Washington Report" for the month recorded relatively minor Congressional actions on parks, wild rivers, and recreation areas. There was a lead article titled "What Can I Do in Conservation?", but the accompanying photographs suggested your most important contributions could be to "pick up litter," "build a birdhouse," "show your nature photographs," and "let your newspaper editor know" about something or other.

In April-May 1966 National Wildlife announced its current "National Conservation Award Winners." Plaques went to a Seattle conservationist for work on better outdoor recreation facilities, a U.S. Senator for supporting national recreation areas, a newspaper columnist for writing about game management principles, a President's wife for fostering beautification, and an industrialist for landscaping his plant grounds. They were all very nice people doing very nice things. No hint of the type of tough heros just over the next hill. This was indeed still the era of a type of conservation which E. Sydney Stevens at the time characterized as like "a little girl in pantalettes with a May basket in her hand." The October-November 1967 issue of National Wildlife listed the sixty articles carried that year. All but fifteen were devoted to birds, mammals, natural history, adventure, plant life, inspiration, or outdoor activities. Of the fifteen on conservation, most were on mild wildlife issues.

Yet just beneath the surface of the magazine's major contents in 1966-67 were the first signs of the coming wave of the new environmentalism. The lead article in April-May 1966 was a blast at the nation's air pollution mess by Thomas L. Kimball, Executive Director of the National Wildlife Federation: "Air pollution may be our biggest pollution problem today. Two-thirds of the population of the United States lives in 7,000 urban areas afflicted with polluted air. Their lungs are gray instead of a healthy pink, and some of them will die, or have their lives shortened, from breathing the polluted air." No bucolic birdwatching here. The new conservation problem was urban and it threatened the human species itself.

In the same issue the redoubtable Ernie Swift, in his brief "Short Talk" column, saw the inexorable relationship between battle in Indochina and conservation in Indiana: "With an undeclared war on our hands, will the resources of our forests, mines, and farms once again be strewn and left to rot on every atoll in the Pacific?" Ernie did not live to see a new generation of college kids take to the streets against both the Vietnam war overseas and environmental degradation at home. But his words were prophetic. A couple of issues later Swift was inveighing against "certain public officials who, after a token effort (at preserving wildlands), wash their hands of their responsibilities and let the commercializers have their way." Again, Ernie was ahead of his time in foreseeing outdoor buffs loving parks and wilderness areas to death in the absence of the crowd controls he knew would be needed. The same December-January 1967 National Wildlife had a sleeper article about how a little old Wisconsin lady in tennis shoes took on a county board and a state conservation commission single-handed—and saved

4,800 acres of forest from axe and plow. Success stories of grassroots action like this were to come to characterize environmental coverage. What was to come was perhaps best foreshadowed by a report in the June-July 1967 *National Wildlife* from the 31st annual National Wildlife Federation meeting at San Francisco, where hundreds of old-line conservationists declared "contamination of our environment" to be the most pressing problem of our time," and one that "demands massive and immediate action to prevent and control pollution." Conservation had come a long way from the day when the most pressing problem was the plume hunter.

The environmental storm broke in 1969, and *National Wildlife* was on top of the story. "Are We Teaching Johnny Conservation?" was the question posed in the December-January issue to Martin W. Schein, Director of the prestigious National Science Foundation Committee on Undergraduate Education in the Biological Sciences. His answer was a resounding, "No!" With perhaps more prescience than he knew, he said what was needed was "a new concept to give the whole natural resource field a new lift," and that "it may come from our urban ecologists." The same issue of *National Wildlife* told the story of how a new breed of environmentalist, the birdwatcher turned activist, had saved Delaware's wildlands by "raising money, buying up, setting aside, restoring." The money came largely from DuPont executives via their Wilmington Garden Club wives. The campaign was masterminded by that essential catalyst in the person of Ted Harvey, himself an expatriate from the world of business.

"A Call to Battle!" was the headline of an April-May story about NWF's annual meeting, accompanying a Gallup poll indicating "73 percent of Americans will pay more taxes to fight conservation problems." The June-July 1969 *National Wildlife* issue picked up the tempo with a feature on the "Outward Bound Adventures" of a new generation of Americans forsaking affluence for the boondocks, and a photo-editorial inspired by the Santa Barbara oil spill, asking "Can man afford to foul his environment?" Even more diagnostic of the changing wind were that year's "Awards for Conservation Achievement": to a radio personality for encouraging citizen action against environmental degradation, to a journalist for his coverage of pressing environmental issues, to a cabinet member for conspicuous contributions to environmental quality, to a women's league president for fomenting environmental action programs, to a U.S. Senator for an aggressive fight against water pollution.

It wasn't just the semantics that were different. A new wind was blowing, typified by "an extensive evaluation of our deteriorating environment" in the August-September 1969 issue—*National Wildlife*'s first "National EQ" report card, anticipating the first annual report of the President's new Council on Environmental Quality. The same issue carried a warning article on how "DDT Threatens You!", not just peregrine falcons; and a report about a Citizens Crusade for Clean Water, a new-style consortium of unlikely bedfellows like conservation organizations, labor unions, consumer groups, professional societies, and local government officials.

In the February-March 1970 issue the editors took off their gloves for a haymaker at water polluters: "The politician who permits pollution to be legal, the farmer whose land drains off chemicals and silt, the industrialist whose plant discharges waste, the apathetic citizen who is not willing to pay for clean water, the alderman whose city discharges untreated sewage." This was no mellow voice from Walden Pond; it was a call to arms. So it was no coincidence that the April-May 1970 issue saw a change in National Wildlife's slogan to "Dedicated to Improving the Quality of the Environment." The lead article was an interview with Professor Paul Ehrlich, apostle of population control, arguing that "Man is the endangered species."

Under Editor John Strohm's theme, "The Do-Or-Die Decade," the June-July 1970 issue took on the mining lobby in Idaho, land developers in Africa, and the Bureau of Reclamation in North Dakota. The next number carried an expose about how "We're Making a Cesspool of the Sea," by U.S. Senator Gaylord Nelson, one of the first politicians to discover environmentalism was good politics; and an open letter from Tom Kimball to President Nixon, pointing out that "$75.5 billion for national defense and only $1 billion for environmental quality means our national priorities are out of whack."

The October-November 1970 National Wildlife was particularly memorable for the magazine's second "EQ Index," a multicolor 10-page spread heralding a message of pure environmentalism: "America is in trouble because our greed, apathy, and blind indifference to human values have put us on a collision course with disaster. Our second annual measure of national environmental quality reveals the sobering fact that we are still losing ground on almost every front. Our air is dirtier. Our water is more polluted. Lands for food, wildlife, and living space are deteriorating. Certain minerals may be exhausted. Surging population threatens environmental quality around the world." The answer: (1) "a bold and comprehensive national land and water use plan," and (2) "an informed and aroused public with a new ecological philosophy." To put teeth into the message, that issue of National Wildlife introduced a new section, the "EQ Critical List," a roster of those "crisis areas needing immediate attention." Rating first mention were a nuclear plant in Alabama, a dam in Illinois, a seashore preserve in Oregon, and an oil refinery in Maine. Meanwhile the National Wildlife Federation was reported calling on Congress for more "money for waste treatment plants and thepurchase of public lands." The little conservation girl with the May basket had disappeared into the mists of the past.

By 1971 environmentalism was really rolling in National Wildlife. December-January: Tom Kimball taking on the Public Land Law Review Commission for "putting one-third of the U.S. up for grabs." February-March: a farsighted question, "Are We Running Out of Fuel?" June-July: Ralph Nader saying, "Students shouting obscenities aren't tearing down America. It's chemical plants, steel mills, coal operations, paper and pulp mills, and utilities that are tearing down the natural resources of the country." October-November: the third annual EQ Index, showing we had seemed to wake up to the real meaning of environmental quality and the interrelationships of energy, economics, and ecology. Lead articles in August-September 1971 had covered William Ruckleshaus of the new Environmental Protection Agency—"the man in the eye of the storm," the mercury poisoning "catastrophe brewing in quiet waters," the "last chance for a tall grass prairie" National Preserve, and the first of a series of "ecology primers." But the big news was in "Washington Report," now grown from a single column to a four-page center spread. "Federation Goes to Court in Four Corners Area," the story read, telling how the NWF had sought an injunction against a coal-burning power plant on Utah's Kaiporawits Plateau that would pollute multiple national parks, forests and wildlands. Convention oratory had been replaced by court action. Five years later the power combine would call it quits at Kaiporawits.

By December-January 1972 the typical environmental hero had escalated to the governor of a state, as recorded in a National Wildlife story about how Russell Peterson of Delaware had "slammed the door in industry's face" when business sought to desecrate Delaware Bay. Governor Peterson was no ecology nut; he was a former DuPont vice president with a simple love of birdwatching. (He recently retired as Chairman of the federal Council on Environmental Quality.)

The next month Tom Kimball introduced economic statistics to show that "spending money to cut pollution will produce big long-run savings." An April-May Gallup Poll indicated "the environmental movement is not faltering." Kimball was back in June-July with an open letter to Presidential candidates, urging them to "get on the environmental bandwagon." The same issue called for "a world-wide effort to conserve dwindling energy resources." And there was a piece by Chet Huntley predicting that the environmental movement was here to stay. The October-November index of 1972 titles listed 23 out of 75 in the new categories of "Environment" and "Conservation Ethic."

As oil wells, welfare rolls, and Watergate engulfed the country, there was a noticeable lessening of the environmental decibel count in 1973 and 1974, but not in the depth of the National Wildlife message. "Now the Real Battle Begins," Editor Strohm headlined the February-March 1974 issue. The Fifth EQ Index showed "we have so little to show, so far to go," he said, "but the situation is not hopeless; if it were we wouldn't be writing about it." The rest is current history, as National Wildlife continues to point out that "most laws passed to protect wildlife protect humankind's own interests more."

Conservation and mass communication have always been symbiotic. The pages of National Wildlife are representative of the signal role of the mass media in the evolution of environmental education.

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PROJECT I-C-E (INSTRUCTION-CURRICULUM-ENVIRONMENT)

by Robert J. Warpinski*

Project I-C-E (Instruction-Curriculum-Environment) had its inception in what has been called the "public-participation revolution" of the late 1960s, and in the federal funds that encouraged such participation. In a northeastern Wisconsin consortium of cooperative educational service agencies, a broadly based educational needs assessment identified environmental education as the No. 1 priority. With federal, state, and local monies, I-C-E became operational August 1970, involving classroom teachers and special consultants in developing K-12 curriculum materials around a dozen strategic themes. Ultimately I-C-E was to produce 39 EE guides for all grades and major discipline areas, impact on 7500 teachers and 160,000 public and non-public pupils in its region, and spin off around the country through the National Diffusion Network. The incorporation of I-C-E materials and approaches in regular school curricula may well have been subjected to more rigorous evaluation than any other broad K-12 EE effort. The result, in summary: "There is statistical evidence to support the effectiveness of the I-C-E program at 2nd, 5th and 8th grades," at least in terms of the cognitive domain.

The major goal of the I-C-E environmental education program is to directly or subtly lead students to awareness, recognition, and appreciation of the vital issues, concerns, and factors shaping environmental attitudes and values. To achieve this goal, a basic set of performance objectives gave direction to activities during the five-year project period, 1970-1975. They were:

I. Curriculum Development

Project staff, selected college and university consultants, and committees of area teachers will write, edit, field test, revise as necessary, and publish for distribution to all area teachers a K-12 series of environmental education guides in the major disciplines of Language Arts, Social Studies, Science, Mathematics, Music and Art, Physical Education, Home Economics, Business Education, Industrial Arts and Agriculture.

II. Instruction Improvement

Project staff and select local consultants will conduct workshops, inservice programs, and provide on-going assistance directed toward

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promoting: 1) general implementation of the I-C-E environmental education program, 2) specific adaptations of the program by local schools/districts, 3) utilization of supplementary instructional resources available from the Project Resource Materials Center (RMC), 4) more effective utilization of available community resources in both natural and man-made environments.

III. Program Evaluation

Project staff will arrange for evaluation of program effectiveness via teacher feedback and student achievement in environmental concept cognition by means of local surveys, monitoring reports, and by formal student testing, pre-post, in an experimental program conducted by an outside evaluation team.

During the five-year project period, there were various other supporting objectives in addition to those cited above. These provided for such efforts as development and use of the resource center, attempts at developing a cadre of change agents in local schools and districts, broad promotion of the concept of K-12 environmental education by means of a National Environmental Education Fair, and those related to general evaluation and dissemination strategies.

Funding Sources and History

Starting with a planning grant and through the five-year operational period, Project I-C-E was funded by Wisconsin, under E.S.E.A. Title III. The total funds expended amount to $423,587 with grants of $62,915 for the first year, $95,612 for year two, $89,302 for year three, $89,981 for year four, and $93,280 for year five. The project served approximately 7500 teachers and 160,000 students, hence the average yearly expenditure per teacher was $12, and approximately 50¢ per student.

In addition to the basic program funds, the project had some additional financial support with special grants. Under E.S.E.A. Title II, there was a $5000 grant for instructional media materials; under the Environmental Education Act a grant of $6000 provided for the National Environmental Education Fair; and under E.S.E.A. Title III, Section 306, a $70,000 grant provided for the formal evaluation of student impact and a $65,000 grant made possible a sixth year program of national dissemination through the U.S.O.E.-sponsored National Diffusion Network. With some carryover funds, local reserves, and additional federal funds anticipated, the I-C-E program continues for the seventh year, again as part of the National Diffusion Network.

On a smaller, but nonetheless significant, scale, other sources of revenue have aided operations. In the fourth year, a schedule of service charges for the project RMC was introduced. This now has been changed to a system of rental fees that provides an income of $2000 annually. Sales of project-developed curriculum materials throughout the nation and in numerous foreign countries reached $9000 during 1975-76. Finally, various area foundations, businesses, and civic groups donated environmental media materials for local use valued at over $3000.

Target Audience

In specific performance areas, the direct target audience was the 235 teachers representing the 53 public school districts and some 122 non-public schools in the regional project area. These teachers from all grade levels and subject areas (excluding foreign languages) participated in training sessions and outdoor workshops, and served on committees drafting, revising, and editing the environmental curriculum guides that form the basis for the I-C-E environmental education program. They were also expected to perform as change agents in their respective districts and schools by general promotion, and through specific arrangements for and assistance in holding inservice sessions to introduce the concept of K-12 environmental education and the I-C-E approach.

Thus, indirectly, the target audience was enlarged to include all teachers (7500) and their students (160,000) in the project's regional area. In many ways, also, the total project community had a certain impact and can be conceived of as a target audience. There are four higher education institutions in the area: University of Wisconsin-Oshkosh, Lawrence University of Appleton, St. Norbert College in DePere, and the University of Wisconsin-Green Bay. Each provided consultants to work with the teacher committees; each introduced the I-C-E program approach to their education department in methods courses; and a number continue to make assignments relative to the I-C-E concepts for environmental education and student reference to the I-C-E RMC collection.

As already noted in the funding section, there are the contributions in media materials from local sources, most significant being the George Kress Foundation (Green Bay Packaging Corporation) and the Brown County Conservation Alliance. But community support and participation came from many sources. They include the Kiwanis, local chapters of the Garden Club and Audubon Society, agencies such as the U.S. Soil Conservation Service and the Wisconsin Department of Natural Resources, and local and regional plan commissions, as well as diverse other individuals in private and public life.

The total project region covered all or parts of twelve counties that include 53 public school districts and 122 non-public schools, with one district located 110 miles from the Project Center, and numerous in the 60-80 mile range. Districts range in size from the larger urban Green Bay, Oshkosh, and Appleton communities to very small rural districts in the northern counties. This area has a cultural and economic diversity with a heavy industry and manufacturing base along the Fox River, a highly productive agricultural and forest industry, with substantial recreation enterprises in several counties. The population base stems largely from northern European immigrants, a substantial native American Indian population, and a small influx of Negroes and Mexican-Americans. The socio-economic level of this region is best characterized as typically average, middle income.

Detailed History

In 1968-1969 the Wisconsin State Title III Advisory Council resolved to approach certain educational needs through a network of Regional Center Projects. The state was divided into eight regions with each region then determining the imperative educational need in its area. Cooperative Educational Service Agencies #3, #8 and #9, in northeastern Wisconsin, were designated as Area "B". A first need determination effort in 1968-1969, conducted by surveying school administrators, failed to produce a clear goal. Hence, in 1969-1970, Area "B" was given a planning grant to make a more exhaustive need determination.

Under the direction of a regional advisory board, a four-man planning team representing the public and non-public educational sector of the area undertook a needs assessment process. In three stages, starting with a broadly representative base of administrators, teachers, public and non-public, students, parents, and the civic and business community, a list of ten priority items were ranked on a basis of need or concern. From this list, a second survey to determine the top five items from the above listing was submitted to area public and non-public school administrators and principals. And, in the final stage, the same respondents were to select the top priority imperative educational need for Area "B".

From this process the resulting imperative educational need was the improvement of instruction and curriculum in the area of environmental education. Under the direction of the advisory board, the planning team wrote an operational proposal to direct a regional effort to meet the designated need.

Following the planning grant that allowed for an extensive needs assessment from October 1969 to June 1970 and the submittal of a program proposal, Project I-C-E was funded on July 15, and became operational on August 1, 1970. Activities in the early months had to be directed primarily to informing area administrators and principals on the nature and intent of the program. Participation had to be on a voluntary basis and all activities and developments were dependent upon the support and cooperation of the area educators. This informing strategy was accomplished by programs scheduled at three different stages—Appleton, Coleman and Green Bay—to minimize travel and encourage attendance.

Follow-up for schools and districts not reached by the information program was accomplished by individual contact. At the same time, the strategy for enlisting teachers to serve on the curriculum committees was established and implemented. District administrators and school principals nominated teachers whom they recommended as excellent, with an interest in environmental education, and a willingness and capacity to serve. The first year developmental effort was confined to Language Arts, Social Studies, and Science, K-12, and thus, from the available pool, teachers were selected according to grade level and subject area needs.

Such curriculum development committees began working in January, 1971, meeting evenings for ten sessions of three hours duration. Orientation and training were provided, and following decisions on approach and format, draft versions of the episode design were produced. Before these decisions were made, however, an effort was made to assess what had been done elsewhere in environmental education programs to avoid obvious duplication. This research led to the decision to use a conceptual approach rather than the more prevalent topical designs then common. From the research study of Robert E. Roth (published by the Wisconsin Research and Development Center), project staff and several consultants developed a list of twelve major categories of environmental concepts that could serve as a framework for the total K-12 program, as well as for each grade level or major discipline. The episode (mini-lesson) design was arrived at in response to teacher needs for simple, practical materials and incorporated such components as the concept involved, application to grade level/subject area, topic designation, behavioral objectives, suggested in-class and community activities, and provided resource and instructional references for teachers. The overall scheme for each committee was to provide episode drafts, a minimum of one for each of the twelve concepts for each grade level in each of the major discipline areas.

A smaller group of teachers was then convened in a summer workshop to revise and edit the draft episodes to provide copy ready for publication. By the beginning of the second school year (1971-1972), the Language Arts, Social Studies, and Science environmental guides were available to area teachers. Program implementation was accomplished in one-hour inservice sessions at most of the school districts, including a number of non-public schools. Where such programs were not possible, distribution of the materials was accomplished via district internal delivery systems, or in the case of the Catholic schools, at the Diocesan Teachers Convention, and by direct delivery to all other schools. Thus, in the discipline areas and grade levels where materials were ready, all area teachers received their appropriate copy or copies. The same strategy was followed in the subsequent year, so that an extensive teacher field test and feedback would be available before a final edition was published.

During the second year, also, a similar teacher committee structure began the development of draft episodes in the remaining major areas of Mathematics, Home Economics, Art and Music, Physical Education, Industrial Arts, Business Education, and Agriculture. And following a second summer workshop, editions of these guides were distributed and further inservice training programs held. At the same time, evaluation of the program became an active component. With project area geographic considerations, a system of pilot schools was identified where program implementation would receive an emphasis and some special project staff assistance would be provided. Teachers in such pilot schools could enlist the help of the project's environmental specialist to assist in planning, to team teach, to lead field trips, to identify community resources, and generally to espouse environmental education among staff. When not directly so involved, the specialist or other project staff were available to other teachers generally. In this same sense, various other strategies were employed to encourage teacher use of the I-C-E materials, the project's resource center, or anything else that would enable them to teach environmentally. Most teachers recognized environmental concerns as vital, hence little time or effort was devoted to establishing cause; yet there always remained the greater challenge of moving teachers from cognition to action.

By the 1973-1974 school year, the earlier guide editions had had a field test of two years, and the second set, one year. Project staff experiences, teacher feedback, and consultations with instructional specialists from the Wisconsin Department of Public Instruction provided sufficient data to indicate need for revisions.

At the elementary level (K-6), for example, the first edition put into the hands of teachers from four to seven booklets (in Language Arts, Social Studies, Mathematics, Science, Art and Music, and Physical Education—depending on whether teachers have available services from specialists in Art, Music or Physical Education). This was overwhelming; hence, the revised edition, one booklet for each grade level, contained a representative collection of episodes from all the disciplines. In addition, the specialist teachers had graded copies available in their area.

For grades 7-12, booklets were published in subject areas traditional to the system. Here the major effort was to cull out episodes of questionable value, fill some voids, and generally upgrade the publications through more careful editing.

A few additional changes were made in general format of the episode design at this time. The most important was keying them to the environmental concept and topic and more directly suggesting subject area/topic integration. Basically, the premise behind the program approach is getting at the environmental concepts via traditional subject areas by substitution of content or activity. In this way, environmental education was not to be additional material or something extra for teachers to do.

Such a revision effort, then, was the task for project staff and another series of teacher committees during 1973-74. As with the previous first draft edition, the revised series was published in-house. This total publication effort (first draft and revisions) exceeded 60,000 booklets during a four-year period. The revised guides were made available to project area individual teachers by request and each district's schools, as well as all non-public schools, received an appropriate master set.

As in all years, there was the continued need to respond to teacher requests, to conduct workshops in natural and urban areas, to provide resources, and to assist at student camping programs or local field trips. Such request files are abundant proof to justify regional environmental centers that can provide such services. Teachers are always looking for help or some better or different way to approach educational needs.

Following 1972-1973, Project I-C-E was nominated for validation by the State Title III office. This IVD (Identification - Validation - Dissemination) process took place in 1973-1974, coming to a successful conclusion in April. I-C-E then was eligible for national dissemination. However, a new stipulation—that of being approved by a USOE-NIE Joint Dissemination Review Panel based on statistical data relative to student impact or change—became a major factor before Title III, Section 306 funds could be granted. Nevertheless, a special Title III, Section 306 grant was received for 1974-1975 that enabled Project I-C-E to conduct an experimental study in order to provide the requisite statistical data.

While regular project services continued during 1974-1975, the more pressing question of student impact data was addressed in a special program effort. Following traditional research designs, experimental and control groups were identified and organized outside the project area. A third component, pre-post test results from schools in the project area, was also matched against the experimental and control groups. Details on design, implementation, and the results are provided in the evaluation section that follows. Suffice here to say that results were positive, and the project passed the JDRP in May, 1975.

Project I-C-E ended its state Title III-supported services as a regional center at the end of June, 1975. At this time, it was funded under Title III, Section 306 to function as a Developer-Demonstration Project in the National Diffusion Network (NDN), which is the project's current status. As such, there are two thrusts: awareness sessions and adoption/adaptation training programs, nationwide. Locally, the project's RMC continues to provide media materials and limited services to schools and districts.

Evaluation

Much of the ongoing, year by year, evaluation in terms of project objectives was quantitative in nature. As such it involved numbers of teachers to be involved, events held, the development of a product and the provision of services. Most of such data came from monitoring reports, teacher feedback, area surveys and various record and logs. Salient among these is the existence of a product--the 39 booklets in the series of environmental education guides, K-12, all grades and major discipline areas, excluding foreign languages. However, in 1972-1973, the project staff began an attempt to assess student impact by developing an Environmental Concern Inventory (ECI) and administering it to a broad sample of students (over 8000) at schools in the project area with diverse histories of implementation of the I-C-E program. While such testing followed the pre-post test design, with six intervening months, it was lacking in other sound research characteristics, and hence gave only indications of possible success, with no real statistical validity. Then, in 1973-1974, another test series, the Environmental Cognitive Inventory (also known as ECI), was developed and further testing of students undertaken. In this instance, experimental or pilot schools, using specific groups of students, were compared against the results of a control group of students in similar grade levels from schools outside of the project area.

Dr. Thomas P. Hogan of the University of Wisconsin-Green Bay provided the analysis, using the techniques of t-test of differences between post-test means for the experimental and control groups, with the hypothesized difference being the mean difference between groups on the pre-test. His conclusion:

> "In the cognitive realm, the experimental groups were better than the control groups at all four grades at least at the .05 level of significance. The magnitude of the differences in grades 2, 8 and 11, though significant, were modest. The difference at grade 5 is quite large. The data for the grade 5 experimental group may be suspect. The differences between means for the experimental and control groups at grade 5 are certainly not consistent with the magnitude of differences obtained at the other three grades. In addition, while the variances for experimental and control groups are very similar in grades 2, 8 and 11, the variance for the experimental group is more than four times the variance for the control group at grade 5. This seems very peculiar.
>
> "In the affective realm, the difference between experimental and control groups was non-significant at grades 2 and 5. In grades 8 and 11, the experimental group had significantly better scores than the control group."

The IVD (Identification - Validation - Dissemination) process during 1973-1974 was conducted by an out-of-state team under the chairmanship of Dr. McKinley Dillingham, Chicago. The "conclusion and recommendations" section of the final validation report is cited here:

> "The Green Bay, Wisconsin I-C-E project is to be considered outstandingly successful and effective as an innovative program. It is an exemplary program in the integration of environmental concepts in the regular school curriculum subject area. There are emerging concerns in our society that are and will be incorporated in the educational programs of children and youth. Today's concerns are with ecology and the preservation of the environment. Project I-C-E has successfully developed ways in which the environmental concern can be incorporated in the total curriculum and at all grade levels. This, indeed, is an innovative concept in the total educational program and it should serve as a model for future educational development.
>
> "Project I-C-E must also be commended for the accomplishment of the goal of directly relating the activities to community needs and resources. This, too, makes it a model program where the concepts developed are basic to educational needs but utilization of local community facilities and the promotion of local interests and needs are encouraged.

> "The third commendable aspect of the program is the development of cognitive and affective domains in the curriculum model. Both were considered equally important for development in the educational program.
>
> "The fourth aspect which is considered a major contribution to the program's success was the complete involvement of teachers. The support displayed by the teacher and, in turn, the enthusiasm displayed by the students who were the recipients of the program, were indeed outstanding—a most deserving compliment to the project staff.
>
> "The only serious recommendation would be to develop ways in which more teachers could be motivated for involvement."

As already noted, the major research design to assess student impact/change was undertaken in 1974-1975 with a special grant for that purpose. The funds provided for additional project staff and contracting for outside evaluations. Under the direction of Dr. Conrad Katzenmeyer from the Wisconsin Research and Development Center, together with a support team, a strict research evaluation design was implemented. The complete effort resided outside the traditional project area, but in communities with similar characteristics as the project area. Also, the characteristics of the experimental and control groups were closely akin. In addition, comparisons were made to similar test groups in the project area.

One of the major efforts was to develop test instruments, a revised version of the Environmental Cognitive Inventory (ECI), that would pass criteria for validity and reliability. Such tests, criterion referenced to objectives in the I-C-E program, were developed as a sampling technique for grades 2, 5, 8 and 11. While somewhat delayed, the pre-tests were administered in late October and early November, the I-C-E program implemented in the experimental schools through April, and post testing done in May.

Dr. Katzenmeyer's report states conclusions as follows:

> "Results strongly favor the I-C-E program students in all but the 11th grade. The most striking results occurred in the 2nd grade where experimental students were significantly higher than the control group on total score, direct and indirect items and concepts 4, 7, 9, 10 and 11. The experimental group showed significant increases in scores for all but four concepts and the experimental group had a higher mean than the control group for all but three of the concepts.
>
> "Fifth grade results were almost as positive. Although the experimental and control schools did not differ on total score, the experimental group had a higher total mean. Significant differences favoring the experimental group were found for concepts 1, 6, 9 and 12 and they scored

> significantly higher on the items directly included in the program curriculum guides. The experimental group showed significant increases for all but three concepts and mean differences favored the experimental group for eight of the twelve concepts.
>
> "Eighth grade results were also positive. Total score was again not significant but the pilot group had a higher mean, and significant differences were found on concepts 1 and 10. Significant increases occurred for the experimental group on ten of the twelve concepts and mean differences favored the experimental group on all but two concepts.
>
> "In contrast to the 2nd, 5th and eighth grade, there was no evidence of effectiveness at the 11th grade. Only one concept was significant, favoring the control school, and this difference had also occurred on the pre-test. The experimental schools showed no significant increases on any of the concepts. These findings affirm impressions of the evaluation team during monitoring visits that, except for one or two isolated instances, the I-C-E program was not substantially implemented at the 11th grade level. This was, no doubt, due to the fact that only three 11th grade teachers participated, which did not provide the necessary saturation of content. At the other grade levels, all teachers participated.
>
> "In summary, there is statistical evidence to support the effectiveness of the I-C-E program at 2nd, 5th and 8th grades. At these levels, all of the statistically-significant findings favored the experimental group and descriptive results reinforced these findings. At the 11th grade the program was not effective, due to limited participation by teachers.
>
> "Two points need to be added regarding the cognitive outcomes. First, the statistical comparison represents only about five months of program implementation which certainly limits the possibility of stronger program effects. Second, I-C-E is a K-12 supplementary program of which the broad scope and content cannot be compared to a unique program such as on energy or a watershed study. Many of the issues may be included in other programs, thus cognitive outcome comparisons may be less than totally revealing of what the program is designed to accomplish."

Finally, one additional evaluation study was conducted during 1975-1976. On a limited basis (grades 2 and 5) a comparison of results is available regarding an out-of-state district adoption of the I-C-E program under the auspices of the National Diffusion Network. The Beaverton, Oregon school system undertook such an adoption and teachers in the program from grades 2 and 5 agreed to pre- and post-test their students. With a test schedule of November-May, student cognitive achievement of the I-C-E environmental concepts were then compared against base data available at the original project site.

This evaluation study was again entrusted to Dr. Conrad Katzenmeyer; his conclusions are as follows:

> "Based on the results of the second and fifth grade testing in Beaverton, Oregon, it can reasonably be concluded that the I-C-E program has had effects similar to those achieved in the 1974-1975 school year. Across years comparisons as well as the comparisons of pre-post scores have demonstrated that the I-C-E program does have an impact on the students' environmental learning. The results for the second graders were somewhat more striking than for fifth grade, but the fifth grade test suffered from having contained a number of items specific to Wisconsin and the midwest. It is recommended that if these tests are to be used across the country, that it may be useful to rewrite certain of these specific items or eliminate them completely from the test before it is used in ensuing evaluations."

Associated Research and Citations

Over the years the I-C-E program effort has merited a number of citations. In August, 1972 and again in May, 1974 the project received "Educational Pacesetter Awards" from the President's National Advisory Council on Supplementary Centers and Services. In December, 1974 Project I-C-E was given an "Excellence in Education Award" by the National Association of State Advisory Council Chairmen. Locally in 1974, the Brown County Conservation Alliance gave an award to the project "In Recognition of Their Outstanding Contribution to the Cause of Conservation in the Field of Education." Region V of the Environmental Protection Agency presented the I-C-E director the 1975 "Environmental Quality Award" in education.

Articles about, and major listings of, Project I-C-E have appeared as follows:

"A Regional Approach to Environmental Education." *The Title III Quarterly*, Spring, 1972.

"All About Project I-C-E." *The Journal of Environmental Education*, Spring, 1974.

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CENTER FOR OPEN/NON-GRADED, CAREER, AND ENVIRONMENTAL PROGRAMS (COCEP)

by Terry L. Wilson*

Centers of expertise serving the school districts of a region with on-call consultants and back-up materials—this is an emerging pattern in U. S. K-12 education. How one such center in Kentucky incorporated environmental education in its repertoire is the subject of this case study. While the thrust of the activity was largely in the form of energizing conventional outdoor education sites, the superintendents involved report the COCEP effort stimulated greater teacher interest in curriculum modification, but no significant gains could be demonstrated in pupil environmental literacy over the three-year period concerned.

INTRODUCTION

This report summarizes the efforts of the COCEP project of Region IV-B, Title III, ESEA, operating during 1973-1976. It is based primarily on the original proposal and on the final project evaluation report.

The Center for Open/Non-Graded, Career, and Environmental Programs (COCEP) functioned as a regional service center to schools in the Central Kentucky area interested in open education, career education, and/or environmental education. Although the overall structure and purpose of the total project are discussed, for the purpose of this report specific information presented is limited to needs, products, and outcomes of the environmental education component of the project.

It should also be mentioned that the project was funded initially by P.L. 89-10, Title III, and completed under the consolidation law P.L. 93-380, Title IV.

NEEDS AND OBJECTIVES (from original proposal)

How needs were determined: General educational needs of Region IV-B were determined via a needs survey conducted by the Division of Research, State Department of Education, in May 1970, as part of the state's Need

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Assessment Study. The survey was stratified along the lines of the eight Title III Regions and in Region IV-B, 679 public school personnel (including school board members), 52 non-public school personnel, and 532 citizens were randomly selected to complete the survey instrument. Each respondent ranked ten general needs and ten specific needs listed under each of the general needs.

Ranking of needs in Region IV-B:

Rank	Learner Need	Sub-Rank*
1	Learning Skills	
	Thinking critically	1
	Reading, writing, mathematics	2
	Analyzing own skills, abilities, and needs	3
	Making sound decisions	4
	Directing own learning activities	8
2	Human Relations	
	Developing positive self-image	1
	Developing positive attitude toward others	2
	Responsibility for self and society	3
	Positive attitude toward work	4
	Working with individuals and groups	5
3	Vocational Knowledge and Skills	
	Acquiring occupational skills and knowledge	1
	Knowledge of wide variety of careers	2
	Knowledge of post-high school studies	3
4	New Approaches to Learning	
	Opportunities to resolve problems	1
	Different use of learner's time in school	2
	Opportunities to learn on own at own rate	3
	Programs that change as learners change	4
	Individualized attention	6

*Ten sub-ranked needs were determined under each overall rank. Only those pertinent to this study are listed.

Priority rankings were derived from a frequency count of those respondents ranking each general and specific need.

U.S. Office of Education priorities were also considered along with the above needs in the planning of the initial proposal. They were as follows:

Early Childhood Education
Environmental Education
Disadvantaged
Human Diversity and Cultural Pluralism
Student/Youth Activism
Reading
Career Education

Needs assessment data and U.S.O.E. priorities, in combination with perceived individual school system needs, indicated that a project involving Career Education, Open/Non-Graded Education, and Environmental Education should be developed utilizing a Regional Service Center approach.

Community Awareness

The Citizens' Advisory Committee for the Educational Needs Assessment project was composed of directors of 15 state-wide organizations including PTA, Womens' Clubs, AFL-CIO, Council of Churches and the like. Their members' responses to the survey instrument and subsequent review of results served to inform them of derived needs for Region IV-B. Other methods utilized in informing citizens of the Needs Survey results were radio programs, television programs, and newspaper articles.

OBJECTIVES

Objectives, as stated in the initial proposal, were to:

1. Operationalize a Regional Service Center for Career, Open/Non-Graded, and Environmental Education.
2. Assist local schools in planning, developing, and implementing Career, Open/Non-Graded, and Environmental Education programs.
3. Enhance the development of cooperative relationships between and among agencies involved in the project.

RATIONALE FOR THE REGIONAL ENVIRONMENTAL EDUCATION COMPONENT AS DEVELOPED IN 1973

"Each day over five square miles of our nation's land surface is becoming urbanized; over 70% of our population resides on 1½% of our land surface; by 1985, 65 million more people will reside in urban areas; our air and water are polluted; strip mining continues largely uncontrolled; noise levels are increasing; industrial wastes are accumulating; water is wasted. We are paying the price for our life style, a style based on urbanization, technology and consumerism. Space ship earth is rapidly losing its capacity to revitalize itself due to man's unwillingness to curb his appetites.

"In an address to Congress in August, 1970, President Nixon said, 'We need new knowledge, new perceptions, new attitudes . . . We seek nothing less than a basic reform in the way our society looks at problems and makes decisions. . . . It is also vital that our entire society develop a new understanding and a new awareness of man's relation to his environment—what might be called 'environmental literacy.' This will require the development and teaching of environmental concepts at every point in the educational process.'

"The above statement by the President continues to have relevance as we move further into the seventies and it becomes increasingly evident that 'environmental literacy,' that is, forming new knowledge, new perceptions, and new attitudes about environmental preservation in our young people, is the basic approach we must take toward the solution of our environmental problems. For as Dr. Elvis Stahr, President, National Audubon Society, illustrated in an address at the Union College Environmental Education Center in 1971, 'It is now abundantly evident that of the countless thousands of species on Earth, not only the most complex, but the most dangerous, is the one called man. Man is the only one to achieve the capability of altering drastically the ecosystems that make life possible and thus to have the ability to destroy himself and all other life. And he is steadily engaged in doing that! . . . What is needed, therefore, is a strategy for taking the offensive. . . . The value choices must be made first, and then the technologists brought into play, in support of these choices. History has already seen too much of the other away around.'

"To help resolve environmental problems that threaten the existence of human life, it is vitally important that citizens of all ages examine their life styles to determine the extent that they reflect a commitment to protect and enhance the environment. The school must, due to its unique position of having practically all young people under its influence for a large portion of their formative years, be involved in presenting environmental alternatives so that value choices may be made from a position of knowledge and intelligent decisions may be made regarding the preservation of the environment.

"It is interesting to note that in the light of the apparent environmental crisis, few school systems have implemented environmental education programs that span the curriculum. In an attempt to introduce environmental concepts at the school level in Region IV-B, the Bourbon County Environmental Education Pilot Program was funded as part of the Region's Title III project during 1970-73. The objectives for this effort were: To illustrate that a small single school outdoor site could be developed with limited resources, to develop materials to be meshed with all regular curricular offerings, to develop a materials resource center, and to enhance student development of positive values and attitudes toward environmental preservation. Fifteen school districts and non-public schools participated in this program on a limited basis and began developing environmental education programs, sites included. This beginning effort served to sensitize the Region's schools to the need for a larger, more comprehensive regional environmental education area with the possibility of a residential area. Few such areas exist in Kentucky and indeed in the nation. Such an area would permit much more comprehensive program offerings than possible at a small local site. The Fayette County School System has been fortunate in obtaining approximately 120 acres of federal land previously part of the Narcotics Hospital complex in Lexington, under the condition that a portion of it be used as a Regional Environmental Education Center. Preliminary data gathered during the 1972-73 school year indicate that 16 school districts with 55,200 students would be interested in participating in a regional program.

"The Region IV-B Board of Directors in its planning for the 73-76 Title III project, strongly supported the development of this area as a component part of its new project. Lynn Hodges, Environmental Education Consultant for the Bureau of Instruction, State Department of Education, and member of the Regional Environmental Education Center Planning Committee, recommended the development of this center for Central Kentucky's schools since none of this type is available in this area of the state. The Fayette County Schools instructional staff and the Program Development Committee envisions the development of a center similar to those already in operation at Land Between the Lakes in Western Kentucky and Pine Mountain Settlement and Union College Environmental Education Center in Eastern Kentucky. The extent that these could be emulated would, of course, be dependent upon availability of funds and engineering data reflecting the characteristics of the proposed site. Regardless of what physical form evolves from the planning and development effort, the site will be available for use by all interested schools in Region IV-B. The Planning Committee, also cognizant of USOE priorities in the area of Environmental Education which encourages teaching environmental concepts at all school levels, structured a program based not only on the development of a regional site but also one which would continue to assist program development in individual schools.

"The development plan for the regional site would provide an excellent model to exhibit to others the way by which such a pasture area, with small wooded sections, can be restored to a more natural state and provide a rich and vital force in the education of youth. The restoration model, depending upon geological factors, is planned to include the following physical development: construction of a small lake stocked with aquatic life, nursery stock cultivation area, soil and topography study area, open and sheltered classrooms, forest areas, living fences, soil and rock profile areas, camping area, amphitheatre, wildlife food production areas, soil type and texture station, plant succession area, soil erosion area, watershed demonstration area, plant identification areas, weather station, etc.

"The program of studies would include integrating environmental concepts into all regular school programs with particular reference to activities which would be carried out at the site—an interdisciplinary approach enhanced by the open-space setting. The development of these programs would be progressive; that is, beginning with a few activities and adding activities as the site is further developed. The Fayette County staff would develop these programs.

"With the proposed development of the regional site and corresponding program areas it would be possible to fully develop a comprehensive ecological program which would offer the opportunity for students to understand more fully that:

1. No living thing exists without influencing or without being influenced by other living things and the surrounding environment.
2. In any particular area relationships are established between living things which form the foundations of natural communities.
3. An interdependency exists in all elements of nature.
4. There are environmental consequences of human acts.
5. Natural resources should be used wisely in order to improve environmental conditions.
6. All forms of life should be respected.
7. The responsibility for individual action in behalf of natural beauty, environmental health, and wise use of natural resources is theirs.

"The Consultant/Coordinator would spend approximately 3/5 of his time in planning the development of the Regional Site. Such planning would include working with agencies which have expressed an interest in cooperating with and assisting the Fayette County Schools and the Region IV-B Title III Project in developing the Regional Site: USDA Soil Conservation Service, Kentucky Department of Forestry, Kentucky Department of Natural Resources, University of Kentucky College of Agriculture, and the Temporary Kentucky Organization (letters of support on file in Region IV-B office). Funds would be budgeted for site planning (consultant services if needed), site development (plantings and labor if involved), consultant/coordinator travel, and if feasible during the first project year, released teacher time for writing programs directly related to utilization of the Regional Site.

"Along with the development of the Regional Site, this project would seek to provide districts, which during the 70-73 project began developing local school programs or became sensitized to the need for developing a program, with continued program development assistance. This would be in keeping with the Service Center concept mandated by the Board of Directors and developed in Planning/Writing sub-committee sessions. A survey of these districts administered during the planning phase of this project indicated the following ranked Environmental Education priority needs at the local school level:

1. Continued planning and developing existing school sites.
2. Teacher training in integrating environmental education concepts into the curriculum.

3. Teacher training in methods of teaching environmental education units.

4. Reviewing and revising existing environmental education guides and units or developing such guides and units for local use.

"At this time, eight public school districts and ten non-public schools are committed to participating in activities during the 73-74 school year. Their level of readiness ranges from strong interest with and without available sites (hopefully, the Regional Site can alleviate this to some degree during the first year of operation) to on-going curricular program with and without sites.

"The Consultant/Coordinator would spend approximately 2/5 of his time working with these districts in site and program development. Funds would be budgeted for: workshops in site and materials development, pilot testing of prepared materials, work at sites, teacher visitation, and consultants as needed. Other agencies which have indicated an interest in assisting in the development of the Regional Site would be encouraged to extend their assistance to those schools working on local sites.

"Prior to the beginning of the 73-74 school year, the Consultant/Coordinator would study Local School participation plans and determine areas of common interest and need. From these data, cooperative in-service workshops would be developed, site visitations arranged, and prepared materials distributed, studied, and evaluated. In this manner, schools with the same interests and needs would be working together to achieve common objectives, thus preventing costly repetition of workshops and time-consuming duplication of Consultant/Coordinator effort.

"Participating Local Schools would be allocated funds for in-service activities based on the number of pupils enrolled. Larger schools would receive more funds than smaller schools for released teacher time and teacher/administrator team travel. An allocation formula would be developed by the Program Development Committee after project funding level is established."

FINAL NARRATIVE REPORT (ABRIDGED)

The Regional Service Center for Open/Non-Graded, Career, and Environmental Programs was operationalized on October 1, 1973 with the employment of a consultant in each of the three project areas. Participating districts and non-public schools were identified, team members to receive in-service training from each school were designated, resource materials centers with materials for use in workshops and loan to local schools were established, plans for in-service workshops were developed, workshops were conducted, and evaluation procedures begun.

An End-of-Year Report to determine administrative efficiency and an Evaluation of Services Report to determine effectiveness of consultants were administered to superintendents and coordinators.

Local schools were assisted in planning, developing and implementing Open/Non-Graded, Career, and Environmental programs. Among components were:

a. Planning Forms: Participating Schools and Teams; Goals and Objectives, Activities, and Budget required.

b. Concepts implemented as a result of program participation.

c. Teacher Knowledge and Attitude Scales.

d. Status reports of extent to which concepts are being taught.

e. Student Knowledge and Attitude Scales.

The development of cooperative relationships between and among agencies involved in the project was enhanced; numerical data indicating the number of activities undertaken cooperatively are presented in the Evaluation Section below.

In terms of project endeavors in which the anticipated results have exceeded expectations and those in which results have not measured up to expectations, solely with respect to the environmental education component:

Exceeded expectations--

1. Quantity and quality of activities developed by writing teams
2. Number of schools developing individual school sites
3. Attendance at regional workshops
4. Cooperation of community agencies in developing the Regional Site and its program
5. Enthusiasm of most team members in conducting local activities

Not measured up to expectations--

1. Utilization of Fayette County Schools Maintenance Department in Regional Site development
2. Communication between a few local coordinators and their team members
3. Tendency for some districts to wait until late in the year to begin participating fully.

In terms of the apparent "greatest change resulting from the project:"

An implied objective of the project is to demonstrate that a Regional Service Center operating with on-call program consultants is a logical and efficient way of delivering effective services to a large number of local schools. Evaluation data supporting the above are included in another section of this report. The nature of these data relates to the number of consultant visits made to local schools and the number of component concepts implemented by local schools during the year.

Acceptance of the shared consultant concept is especially important in that local schools will have opportunities to cooperatively structure such an organizational pattern when Education Development Regions are in the process of being operationalized in the Central Kentucky area. Hopefully, this three-year experimental Title III effort will illustrate the efficiency of such services and shared consultants and other resources will be incorporated into EDR operations.

Community agencies cooperating in the project included:

Associated Press (Lexington Office)
University of Kentucky College of Education
University of Kentucky College of Agriculture
Eastern Kentucky University
Division of Economic Security
Division of Fish and Wildlife
Curriculum Development Center University of Kentucky
Witherspoon Foundation
Business, Industries, and Professions in local school districts
Harrodsburg Cable T.V.
Chambers of Commerce in local school districts
Soil Conservation Service (District and State Offices)
Forestry Service
U.S. Public Health Hospital
Women's Clubs
Buckley Hills Audubon Society and Wildlife Sanctuary
County 4-H Clubs
Kentucky Coal Association
Lexington Herald-Leader
Fayette County School personnel
Land Between Lakes Environmental Education Center
Pine Mountain Environmental Education Center
State Department of Education
Lexington Living Arts and Science Center

Local educational agencies and counties served included:

Counties	Public Schools	Non-Public Schools
Anderson	Anderson County	
Bourbon	Bourbon County Paris Independent	MMI, St. Mary's
Boyle	Boyle County Kentucky School for Deaf Danville Independent	
Clark	Clark County	St. Agatha
Estill	Estill County	
Fayette	Fayette County	Lexington Catholic, Lexington School, Mary Queen of Holy Rosary, Bluegrass Baptist, St. Paul, St. Peter, Sayer, Seventh Day Adventist, United Cerebral Palsy and Christ the King
Franklin	Franklin County Frankfort Independent Rosenwald Lab	Capital Day, Good Shepherd
Garrard	Garrard County	
Harrison	Harrison County	St. Edwards
*Henry	*Henry County	
Jessamine	Jessamine County	
Lincoln	**Lincoln County	
Madison	Madison County Berea Independent Richmond Independent Model Lab	**St. Mark
*Marion	*Marion County	
Mercer	Mercer County Burgin Independent Harrodsburg Independent	St. Andrews
*Montgomery	*Montgomery County *Mt. Sterling Independent	
*Nelson	*Nelson County	*Bethlehem High School *St. Joseph
Nicholas	Nicholas County	
*Powell	Powell County	
Scott	Scott County	
*Shelby	*Shelby County	
*Washington	*Washington County	*St. Dominic
Woodford	Woodford County	St. Leo Margaret Hall

*Transferred out of Region IV-B during the course of the project due to realignment of regional boundaries.

**Moved into Region IV-B during the course of the project due to realignment of regional boundaries.

Project information was disseminated through the following mechanisms:

a. Monthly newsletter to interested agencies
b. Television presentation
c. Newspaper articles
d. State-wide Title III Visitation Program
e. Slide-tape presentations
f. Radio programs
g. Project orientation sessions to local schools
h. Sharing workshop
i. Project orientation sessions to colleges and universities in region and state

Approximately 20 unsolicited requests for information from persons outside Region IV-B were responded to and approximately 125 visitors to program sites were recorded. Cost for dissemination activities was $2500 (not including Orientation Sessions) for publishing and printing, video tapes, and slide tape development.

Methods and procedures being developed to carry the project forward without federal support after the designated approval period included:

> The COCEP project provides each local school district a small amount of funds and "on call" consultant services for program implementation. The major portion of staff time, resources, and materials needed to implement must come from local funds. These programs are largely planned and developed by local staffs with the center's assistance and is essentially THEIR program. Since it is their program and one that is not forced upon them, the likelihood that it will continue after Title III funds are withdrawn is increased.
>
> Plans for continuing the Service Center concept is linked to the assured operationalizing of the Educational Development Regions in the Central Kentucky area. Hopefully, the Title III projects' three-year operation will stimulate districts to cooperatively employ various consultants when the EDR's become operational. No further plans for carrying this concept forward have been made.

FINAL EVALUATION REPORT (ABRIDGED)

End of Year Evaluation—administered to Superintendents and Coordinators

1. How would you rate the Region IV-B staff's helpfulness in assisting your district or school in utilizing the project's services?

	Superintendents	Coordinators
Very helpful	81.3%	69.0%
Helpful	12.5%	27.6%
Some help	0.0%	3.4%
Little help	6.3%	0.0%
No help	0.0%	0.0%

2. How have project activities assisted you in improving your district's or school's in-service program?

	Superintendents	Coordinators
Stimulated better planning and organization	68.8%	58.7%
Stimulated greater teacher interest	87.5%	93.1%
Stimulated greater teacher participation	87.5%	89.7%
Increased consultant use	56.3%	58.6%
Stimulated cooperation with other schools	43.8%	44.8%
Stimulated greater staff interest in learning about new programs	75.0%	62.1%
Has not helped improve our program	12.5%	6.1%

3. How would you rate the dissemination procedures utilized by the Region IV-B office?

5 - Information effectively disseminated to 1 - Ineffective

Superintendents' mean rating	4.44
Coordinators' mean rating	4.45

4. To what extent does the newsletter "Catalyst" provide information relevant to project operations?

	Superintendents	Coordinators
Great	33.3%	32.1%
Some	60.0%	64.3%
Little	6.7%	3.6%
None	0.0%	0.0%

5. How would you rate the Region IV-B staff's efforts to facilitate cooperative programs among districts?

	Superintendents	Coordinators
Very effective	37.5%	39.3%
Effective	56.3%	53.6%
Somewhat effective	6.2%	3.6%
Mildly effective	0.0%	3.6%
Not effective	0.0%	0.0%

6. How would you rate the overall effectiveness of the project in stimulating your staff in becoming interested in implementing new instructional programs?

	Superintendents	Coordinators
Very effective	37.5%	27.6%
Effective	56.3%	65.5%
Somewhat effective	0.0%	3.4%
Not effective	6.3%	3.4%

7. How would you rate the procedures listed in the "Operating Procedures Bulletin"?

5 - Clearly stated to 1 - Vaguely stated

Superintendents' mean rating	4.25
Coordinators' mean rating	4.35

5 - Clearly illustrated to 1 - Poorly illustrated

Superintendents' mean rating	4.53
Coordinators' mean rating	4.39

5 - Easy to comply with to 1 - Difficult to comply with

Superintendents' mean rating	4.31
Coordinators' mean rating	4.26

Evaluation of Instructional Services - administered to Coordinators

1. How efficiently was initial information about component operation disseminated?

5 - Efficiently to 1 - Inefficiently

Environmental mean rating	4.35

2. Rating of Regional Workshops—5 - Excellent to 1 - Poor

a. Organization

Environmental mean rating	4.42

b. Content

Environmental mean rating	4.42

c. Applicability

Environmental mean rating	4.28

3. Rating of materials from COCEP office--5 - Excellent to 1 - Poor

a. Quantity

Environmental mean rating	3.81

b. Quality

Environmental mean rating	4.10

4. Rate the COCEP Consultants--5 - Excellent to 1 - Poor

a. Availability Environmental mean rating	4.61
b. Knowledge of component concepts Environmental mean rating	4.69
c. Planning competency Environmental mean rating	4.53
d. Conducting workshops Environmental mean rating	4.53
e. Understanding local problems Environmental mean rating	4.38

The above data from the two instruments indicate that the project was administered with some degree of efficiency and that services were delivered to districts efficiently and competently.

EVALUATION OF OBJECTIVES SPECIFIC TO ENVIRONMENTAL EDUCATION COMPONENT

1. Local school teams will complete site plans as indicated by the COCEP Environmental Education Site Development Inventory administered on a pre-post basis.

Site Development Inventory

Inventory consists of 13 development areas with the following response options:

0 - no plans
1 - planning stage
2 - construction begun
3 - nearing completion
4 - completed
(means for 14 sites)

Area	73-74 Fall	73-74 Spring	74-75 Fall	74-75 Spring
Overall site plans	.29	1.14	1.71	2.42
Trails	.14	.86	1.57	2.21
Trail signs	.14	.57	1.00	1.71
Observation blinds	.00	.43	.57	1.21
Open classroom	.14	1.00	2.00	2.43
Weather station	.00	.29	.43	1.29
Bird houses	.14	.71	1.57	2.36
Bird feeders	.14	.71	1.43	2.36
Plantings	.00	.71	1.86	2.64

Learning stations	.29	.86	1.43	2.50
Identification tags	.14	.57	1.00	1.64
Bird watching building	.00	.14	.29	2.66
Pond construction	.43	.86	1.57	3.85
13 Item Mean =	.14	.68	1.26	2.25

Mean increases indicate progress toward planning and development of Local School sites is being made.

2. Participating team members will display significant increases in knowledge of and attitude toward environmental concepts as measured by pre-post applications of Environmental Knowledge Proficiency and Environmental Concepts forms developed in the Bourbon County Environmental Education Pilot Project.

Knowledge proficiency test composed of 30 true-false items: high score 30 and low score 0.

	N	Pre-Mean	Post-Mean	t	P
73-74	155	20.3	21.6	2.00	<.05
74-75	82				

Concepts scale consists of 25 statements with a response pattern of 4-strongly agree to 1-strongly disagree. High score of 100 and low score of 25.

	N	Pre-Mean	Post-Mean	t	P
73-74	159	74.1	76.6	1.95	<.05
74-75	82				

Differences in pre and post means on both tests were significant; therefore, this objective was attained.

3. A sample of students of participating team members will display significant increases in knowledge and attitude as measured by the same tests in Objective #2.

Knowledge

	N	Pre-Mean	Post-Mean	t	P
73-74	101	14.7	15.5	.77	NS
74-75	102				

Concepts

	N	Pre-Mean	Post-Mean	t	P
73-74	101	72.9	73.1	.19	NS
74-75	93				

Even though both samples indicated positive gains, neither was statistically significant.

4. Participating team members will display increased positive attitude toward Environmental concepts by implementing activities in their classrooms.

Activities Implemented	No. of Primary Teachers	No. of Inter. Teachers	No. of J.H.& H.S. Teachers
Utilizing sites for activities	24	23	37
Utilizing local consultants	13	10	10
Environmental education units	22	19	23
Activities coordinated with other agencies		4	5
Integration of activities with subjects	39	36	33
Problem solving-inquiry approach	28	25	25
Classroom environmental projects	3		2

5. Participating team members will complete a Status Report of Environmental Education classroom activities on a pre-post basis to determine progress made toward incorporating concepts into all parts of school program.

A. I teach environmental concepts in my class.

	Yes	No
73-74	83.2%	16.8%
74-75	100.0%	0.0%

	73-74	74-75
1) Concepts taught as separate units	20.9%	22.2%
2) Concepts integrated into subjects	60.4%	38.4%
3) Concepts taught as randomly arise	92.5%	37.4%

B. To what extent are concepts taught?	73-74	74-75
Quite often	16.8%	34.5%
Often	46.2%	49.1%
Every now and then	32.8%	14.6%
Seldom	4.2%	1.8%
Never	0.0%	0.0%

C. What percent of time do you introduce these concepts?

73-74	40.4%
74-75	45.7%

D. What percent of time do students introduce these concepts?

73-74	20.8%
74-75	23.3%

E. How often are these concepts introduced through audio-visual materials?

73-74	20.1%
74-75	16.4%

F. How often are these concepts introduced in an outdoor setting?

73-74	6.6%
74-75	19.2%

G. How many times have you observed classes in which environmental concepts were being taught?

73-74 mean	.48
74-75 mean	2.39

H. How many environmental education workshops have you participated in?

	No. of Workshops	No. of Days
73-74 mean	.47	.78
74-75 mean	3.80	5.24

The Status Report indicates team members are making substantial progress toward incorporating environmental concepts into the school program.

EPILOGUE

As the preceding case studies indicate, Americans are coming to appreciate the "oneness" of the elements of their environment—that insects, birds, fish, animals, water, soil, wilderness, trees, plants, cities, and humankind are all part of the same scheme of nature, a sort of intricately woven fabric; snip one thread and the whole thing begins to unravel. Americans are coming to appreciate as well a continuing and intimate relationship with their natural surroundings that defies the curtains of civilization.

ENVIRONMENTAL CONCERNS

As seldom before, Americans are expressing a deep concern about the management of their environment. The public prints have made "the rape of the land" a headline story. Our general values and our social objectives are beginning to permit us to make viable choices respecting the utilization of natural resources. We no longer assume that all land and water must inevitably be devoted to the basic sustenance and protection of classic economics. We are ready for what Lewis (1967) called "a second integrated look" to identify the meaningful natural and cultural resources which, if protected and enhanced, can provide many types of environmental experiences for richer living, working, playing—and survival.

As seldom before, Americans are acting to conserve. Too often, the act may be too little, too late, but each act is at least some evidence of faith, hope, and maybe even love. Legislative bodies at all levels of government, public agencies, and private groups are seeking answers to the difficult questions posed by multiplying man and disappearing land. The alarm had been sounded by Senators like Nelson (1969), calling on "the energy, idealism, and drive of the oncoming generation" to save us from "the poisonous air and deadly waters of the earth." The alarm had been sounded by ecologists like Ehrlich (1969), asking us to see "the connection between growing population and steady deterioration of the quality of life before our planet is irreversibly ruined." The alarm had been sounded also by public figures like Godfrey (1969), declaring that "our country's highest priority in the 1970's must be survival." Epitomizing public response to such warning was the establishment, under a 1969 National Environmental Policy Act, of a three-man Council on Environmental Quality to "advise, assist, and support the President of the United States on all environmental concerns."

ENVIRONMENTAL EDUCATION CRITERIA

To support growing ecological efforts to come to grips with the degradation of man's interlaced surroundings and impending energy shortages, environmental education has emerged. Some might say this term has sprung into being merely to lend a charismatic quality to the matter with which it is associated. On the contrary, the term has come into use to satisfy the very real need to describe, if not a new program or set of programs, at least a new way of looking at a variety of old programs, their relationships, and their potential contributions.

While no pinpoint definition or delimitation of the term "environmental education" is possible at this time, and indeed may never be desirable, we can list the factors or criteria that seem to be implicit in the use of the term, as suggested by our case studies:

First, we are concerned with the environment of humankind. It is possible, of course, to study the physical nature or the biological characteristics of the environment on an infra-human basis, but the concept in environmental education is the study of humans as they affect and are affected by their environments, for good or ill. The focus, in addition, is upon the growing number of humans concentrating in increasing densities and bringing greater pressures to bear upon the environment.

Second, we are concerned with the total environment: its social, cultural, economic, and esthetic, as well as its physical and biological, aspects. To seek an optimum total environment requires both an understanding of human needs and the needs of a healthy living natural environment. Any discussion of the goals of society must quickly draw upon a knowledge of the nature of the world people live in, just as any discussion of a balance of nature today must take into account the necessary impingements of humankind.

Third, we are concerned with interdisciplinary programs. The development and management of an optimum total human environment requires an understanding of the contributions which can and must be made individually and collectively by all the arts, sciences, and professions.

Fourth, we are concerned with integrated programs that have as their ultimate rationale the clarification of open-ended options for environmental protection, rather than short-term "solutions" that may actually degrade the environment. We are concerned with the adjustment of designed time and space for optimum human performance within the carrying capacities of the environment. The desired objective is to bring conflicting forces into functional relationships, resulting in a unity called order, an order where human impact does not needlessly destroy environmental solvency and where environmental solvency contributes to more fruitful human life, liberty, and the pursuit of happiness.

Finally, while we recognize the essential importance of strengthening existing disciplines, we look toward teaching, research, and service configurations that will transcend traditional lines of endeavor, and be concerned with the wholeness of the relationship between humankind and the total environment. What we seek is integrated environmental management based in the scientific method and expressing esthetic dimensions.

CHARACTERISTICS OF SUCCESS

The case studies in this collection testify to the varied applications our criteria have taken in recent years. The case studies testify as well to certain common characteristics that seem associated with successful environmental education programs:

Environmentalism is invariably crisis-oriented. Unless there is a perceived critical situation, we don't get off the ground in environmental education. There also must be present a small cadre of committed people. As a matter of fact, time and again as you read these case studies, you are struck by the fact that a single person performs the role of catalyst. He or she has a cause, a creed, that attracts others. Then this cadre tends to form a consortium with other centers of interest, leading to a critical mass that appears to be the difference between success and failure.

Equally important is a concept of operation, a systematic plan, featuring a communication program designed to win cohorts from the larger citizenry. The communication plan will frequently feature the crystalization of program principles and approaches into concepts that are easy to grasp.

Environmental educators are marked by a native confidence that what they are doing will make a difference, but they are not so naive as to be unprepared for conflicts in and out of their establishments; nor are they adverse to the kinds of compromises that are the glue of organized society.

But if there are two criteria of success revealed above all in these case studies of environmental education, one would be a favorable climate of public and professional opinion in which to operate, and the other would be cash. Without sufficient awareness, interest, and understanding on the part of constituencies, environmental education programs either do not take root or they wither on the vine. And without fiscal wherewithall—sustained funding—environmental education programs fade.

Where a concatenation of all these factors has been absent, environmental education programs are absent. Where these factors are present, they foster the types of environmental education programs represented in this collection of case studies.

ASSESSMENTS AND AZIMUTHS

Is environmental education working? That is debatable. There are no environmental quotient (EQ) tests that have measured national ecological literacy over time. We do know that in some public opinion polls Americans rated the environment as a more serious issue in the early 1970's than Vietnam, crime, or the economy (Erskine, 1972). More recently, the Opinion Research Corporation reported that "environmental protection has been transformed into a popular, institutionalized movement which shows little sign of abating, even during a period of economic stress" (NAEE, 1975). But any public popularity of environmental protection has yet to be translated into, for example, a widespread renunciation of the eight-cylinder passenger car or canned beer. While a triennial study of campers in a midwest National Forest indicated their academic EQ in 1974 was significantly above that of 1968, the energy situation in 1974 "had no limiting effect on the outdoor recreation patterns" of the same campers (Schoenfeld and Smith, 1975). A research report by Asch and Shore (1975) provides evidence that a group of children exposed to a formal program of environmental education can demonstrate in a natural setting more conservational behavior than a control group, and less destructive behavior. But teen-age vandalism generally can scarcely be said to have abated.

On the whole, however, it would be very difficult to argue that environmental education may not have had an impact on the course of national events in the past five years: strengthened air and water pollution control programs; land and water conservation funds; embargoes on SST's, Florida airports, western power plants, and Carolina dams; an Alaskan pipeline brought under some semblance of surveillance, the same for a massive underground radio antenna; a rare and endangered species act; a slowdown in the birthrate; the search for an entente with nuclear energy, strip-mining, and I-highways; eastern Wilderness officially classified—these and other actions are not necessarily accidental; they may be the fruit of a new view of people-resource relationships, engendered by environmental education in many forms.

What should be our azimuths in environmental education in the years ahead? At the outset, environmental educators might well stop arguing semantics about how many process angels can dance on the head of a content pin, and get down to work; there's plenty of room for everybody. And they could stop complaining about lack of federal funding and instead energize home-talent programs; it's a myth that we must have somebody else's money to do our thing. Environmental activists need less preaching and more politicking; reluctance to use "the system" merely means the system will have that much more opportunity to ignore environmental issues. Nature lovers of preservationist bent cannot simply turn the clock back to an agrarian era; they must accommodate the complex economic and technological realities their fellow citizens face. Schools and colleges increasingly can involve all the disciplines in presenting environmental studies as an essential ingredient of basic curricula, and in getting both students and faculty out of the classrooms to encounter real-life environment issues (Witt, 1976), (Cook, 1976). The voluntary citizen organizations that have largely carried the conservation education ball over the years can mute their parochial messages and sharpen their tools of leverage. The resource management agencies need an expanded research base that will replace seat-of-the-pants hunches with documented options. Business and labor must make peace with environmental constraints quite as much as with the rules of economics. The media can lend to the environment the same continuing coverage in depth they habitually devote to the stock market and sports. Collectively, environmental education can develop an overall strategy, identify some attainable priority targets and attack selected beachheads one at a time, instead of trying to win the war by knee-jerk massive retaliation, albeit recognizing that profound social, political, and economic tides will ultimately control the scope and velocity of the attack. Particularly, there is great need for solid research as the basis for excellence in environmental education (Smith, 1976). Models for evaluating environmental education programs are "almost non-existent" (Wert, 1976). Roth and others (1976), however, have perfected a methodology and technique for measuring environmental literacy and have established a baseline through studies of high school students in the United States, England, and Australia.

To carry environmental education forward more vigorously on the part of educational institutions, leaders call for evaluation research, for something more than lip-service aid on the part of many state bureaus of public instruction and resource management, for broad-based public planning, and for an end to naivete in seeking political support and private funding (McInnis and Albrecht, 1975). Above all, we must ask ourselves the tough question: Is there enough emphasis on the attainment of environmental literacy at the grade school level if we are to protect the environment in the long run? K-8 textbooks are not always on the side of the angels. It is not too many years ago that a standard elementary science reference, sponsored by the National Science Foundation, lauded the role of DDT in preventive health, with no mention of its environmental hazards. More recently the NSF has developed an excellent Environmental Science (ES) program through the American Geological Institute, and has sponsored a new Outdoor Biology Instructional Strategies program (OBIS) which has won wide acceptance.

The strategic continental objective is an open marketplace of ideas, with environmental educators of varying persuasions vying for attention, outlining varying options, and contributing to a mass facility with the democratic decision-making process. It is the making of sophisticated choices, the rendering of subtle value judgments, that is the essence of environmentalism today, whether the issue is weaponry, water, or whales. The prime task of environmental education is a good old American goal—to reinforce more freedom of choice. The citizen who wants to conserve must be given more chance to conserve—in the home, in the marketplace, at the ballot box. Environmental educators will increasingly be put to the test of discovering and implementing viable options in an unemotional, objective, self-disciplined manner. If their expertise comes wrapped in superficiality, pretentiousness, over-emotion, or, even worse, intellectual dishonesty, they only add moral insult to environmental injury in a most unecological way.

Environmental education has this over-riding responsibility—somehow to impart a sure recognition of the utter interdependency of every element in our interlocking systems of ecology, energy, and economics (Commoner, 1976). There are no unilateral solutions; there are only uneasy choices. If we make the right ones, we may restore the circle of renewable life systems. If we do not, it will simply mean the human animal was not a species destined to survive. We may discuss food separately, or population, or poverty, or wildlife, or shelter, or energy. But where do they all come together, reacting on each other, enhancing hope, or undermining it? In environmental education (Ward, 1976).

Jordahl (1976) looks to more emphasis on (1) a basic understanding of the earth's resources, (2) a knowledge of their interrelationships, (3) identification of each problem and its root cause, and (4) options for corrective actions that attack the disease, not its symptoms.

In summary, environmental education involves imparting cognitive content about the environment through written, spoken, or pictorial messages, and arranging affective experiences through environmental encounters. Environmental educators come in pelage of many colors. They seek to encourage public awareness of environmental problems; public understanding of underlying principles, issues, and options; and a public commitment to individual and collective action.

In our society, enlightened resource management for environmental responsibility depends to a great extent on this aware, informed, understanding and active public. To a significant degree it is environmental educators who will help form the public attitudes and actions that are at the heart of identifying environmental problems and arriving at solutions in keeping with ecological principles, engineering capabilities, esthetic values, and economic wherewithall.

Growing national programs of resource management for environmental responsibility depend increasingly on regional and local involvement. Environmental educators can help provide sound educational materials and adept counsel on the facts of environmental housekeeping. They can help lay a basis for environmental action by clarifying the choices in land and water use, by relating them to viable values and social objectives, by preparing people for constructive change, and by interpreting practical guidelines to the emergence of a national ecological conscience.

The selected case studies in this book have suggested a variety of ways and means.

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